Chemical Week

February 2, 1957

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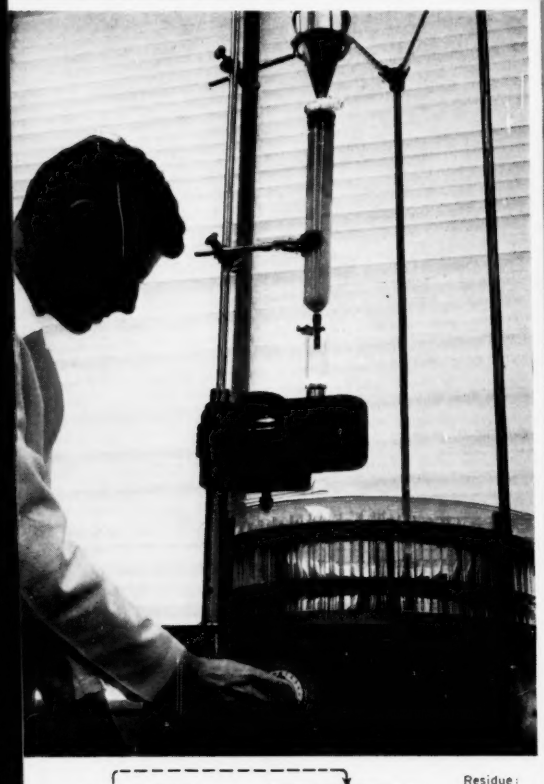

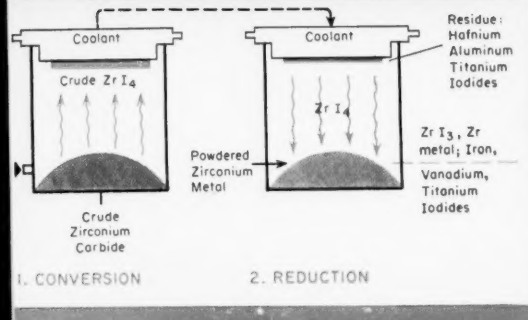

Another plant for Lake Charles. Here's the story behind the Louisiana border building boom . p. 21

Forgotten man of the laboratory? Not any more—technicians get big boost in manpower study . . p. 40

Taller Canadian tariff walls are in prospect as Dominion moves to boost domestic industry . . p. 32

Purchasing automation is catching on. What will it do to your buying practices? . . . . . p. 68

New zirconium process: purification with halogens is the key to hafnium-free product . . . . p. 58

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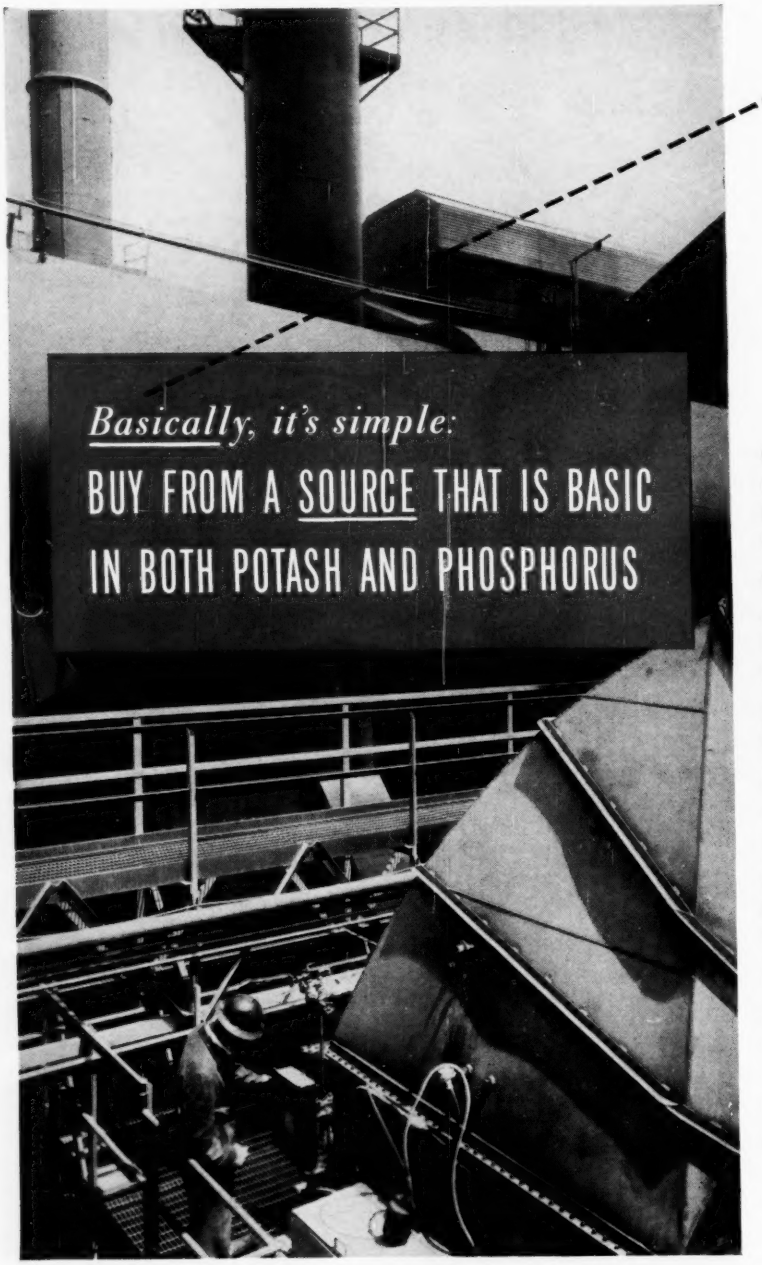

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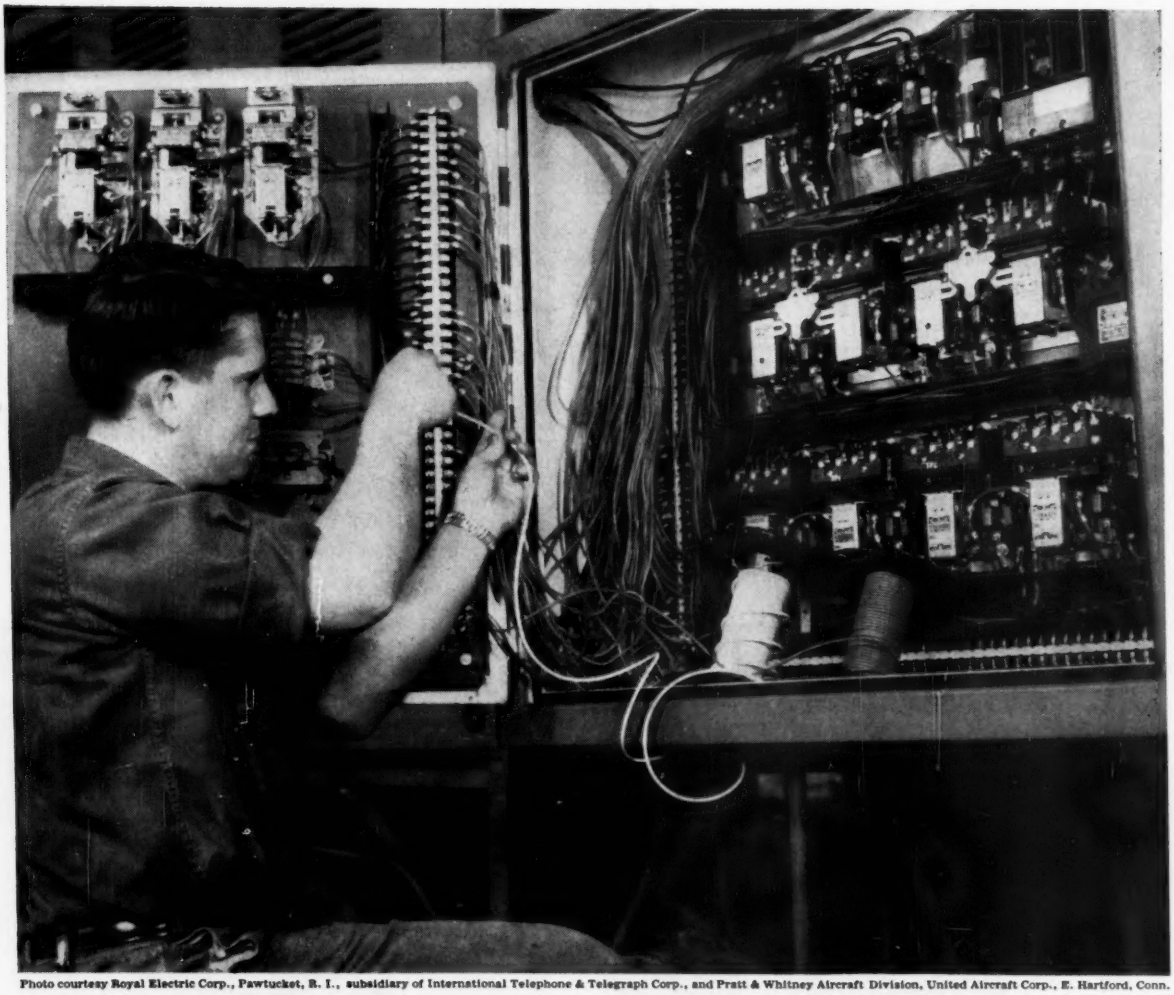

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Chemical Week

TOP OF THE WEEK

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Low-pressure polyethylene will be produced by Allied at Tonawanda, N.Y., using its own process .....p. 22

The increase in minimum wages meant little to the chemical and allied products industries, new government report indicates .....p. 34

Plastic coatings for teeth are the target. Here's why it's worth aiming for .....p. 49

Maintenance men swap ideas on how to do more with current staff, and on how to get more men ....p. 60

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33 Organic chemical makers may bear brunt of new legal action, former government official warns

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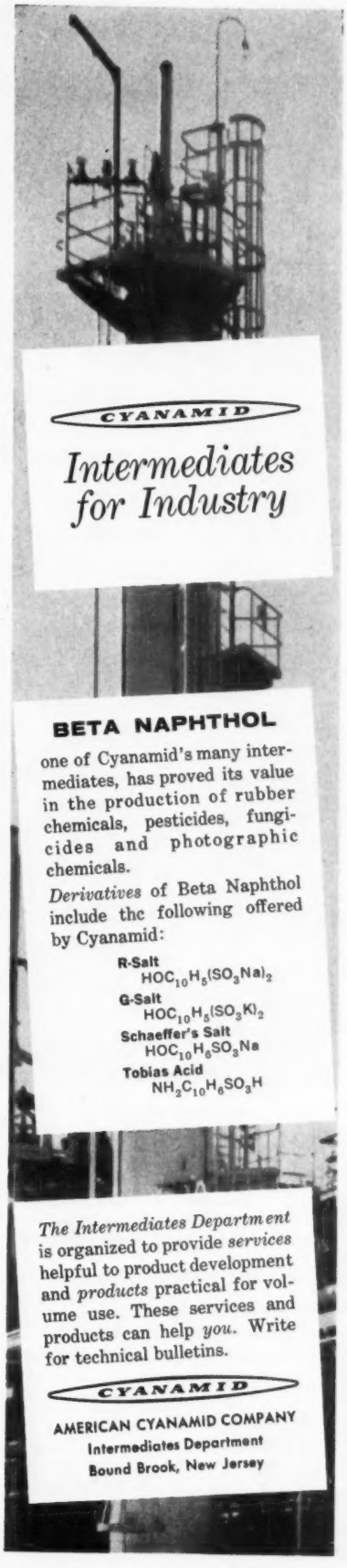
80 MARKETS

Pleasure boats are a brisk market for chemicals. Here's the broad picture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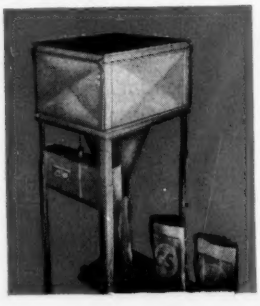

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February 2, 1957 *Vol. 80, No. 5*

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Subscriptions to Chemical Week are solicited from management men in the chemical process industries. Position and company connection must be indicated on subscription order. Address all subscription communications to Chemical Week Subscription Service, 330 W. 42nd St., New York 36, N. Y., or 1309 Noble St., Philadelphia 23, Pa. Allow one month for change of address.

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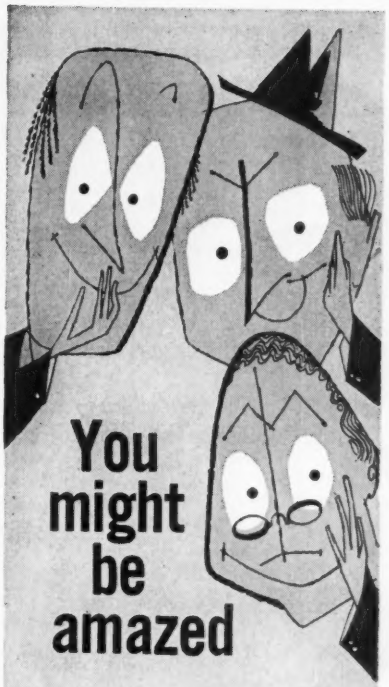

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Life on the Chemical Newsfront

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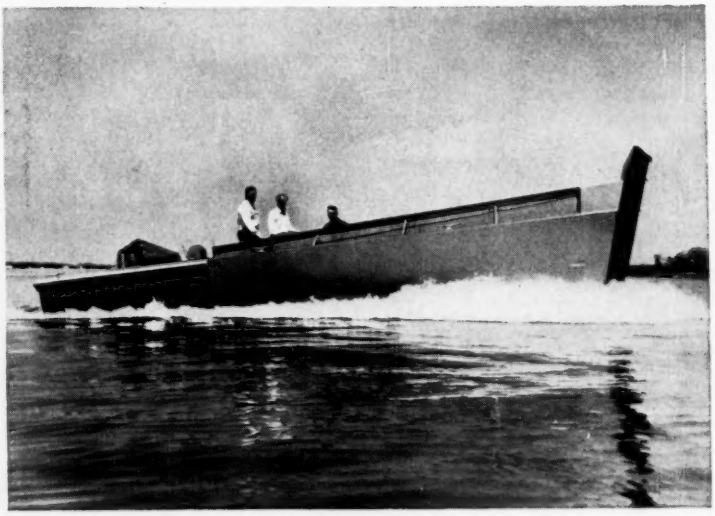
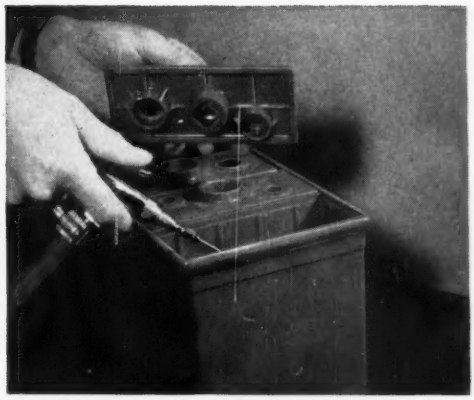


A PLASTIC "NAVY" is in the making at Lunn Laminates Inc., of Huntington Station, N. Y. Successful U. S. Navy tests on a 36-foot landing craft hull led to an initial order for a small fleet of these one-piece reinforced plastic vessels. Fabricated of LAMINAC® Polyester Resin and glass fiber with a honeycomb core, the hull is rust-free and rotproof, insuring many years of service – or moth-balling – with negligible maintenance. The seam-free hull is exceptionally strong, but any damage can be quickly repaired by on-the-spot patching. LAMINAC Resin also is used to produce "navies" of sailboats, cabin cruisers, dinghies and other pleasure craft—and to cover old wooden hulls. Owners can spend more time enjoying their boats, less time maintaining them.
(Plastics and Resins Division)

GREASE PENETRATION OF PAPER IS STOPPED by a very thin film of Cyanamid's new CYPEL® Paper Resin. The photo shows how dyed turpentine penetrates untreated paper almost instantly—yet has not penetrated the stock coated with CYPEL after many hours. This greatly accelerated test of grease penetration proves the exceptional value of CYPEL Resin for papers requiring indefinite resistance to grease, oil and similar materials. Supplied as an anionic emulsion, CYPEL Resin is compatible with most coating and sizing materials. The films are very flexible and have good heat-sealing properties.
*Trademark **(Industrial Chemicals Division, Dept. D)**

MORE ECONOMICAL WEED KILLERS are in prospect as costs are cut on herbicides made from cyanuric chloride. The new low price announced by Cyanamid on this reactive intermediate is expected to reflect itself in an increased market for the weed killers currently made from it. Other derivatives based on the remarkably stable triazine ring of cyanuric chloride will now have greater commercial promise than before in other agricultural products, such as insecticides and fungicides. Specialty resins, surfactants and rubber chemicals are among the industrial applications that will also benefit from the lower price of Cyanamid's AERO® Cyanuric Chloride.

(Industrial Chemicals Division, Dept. D)



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FORMULA:

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TYPICAL ANALYSIS:

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Ash	5 p.p.m.
Iron	0.5 p.p.m.
Water	0.05%
Color, A.P.H.A.	6

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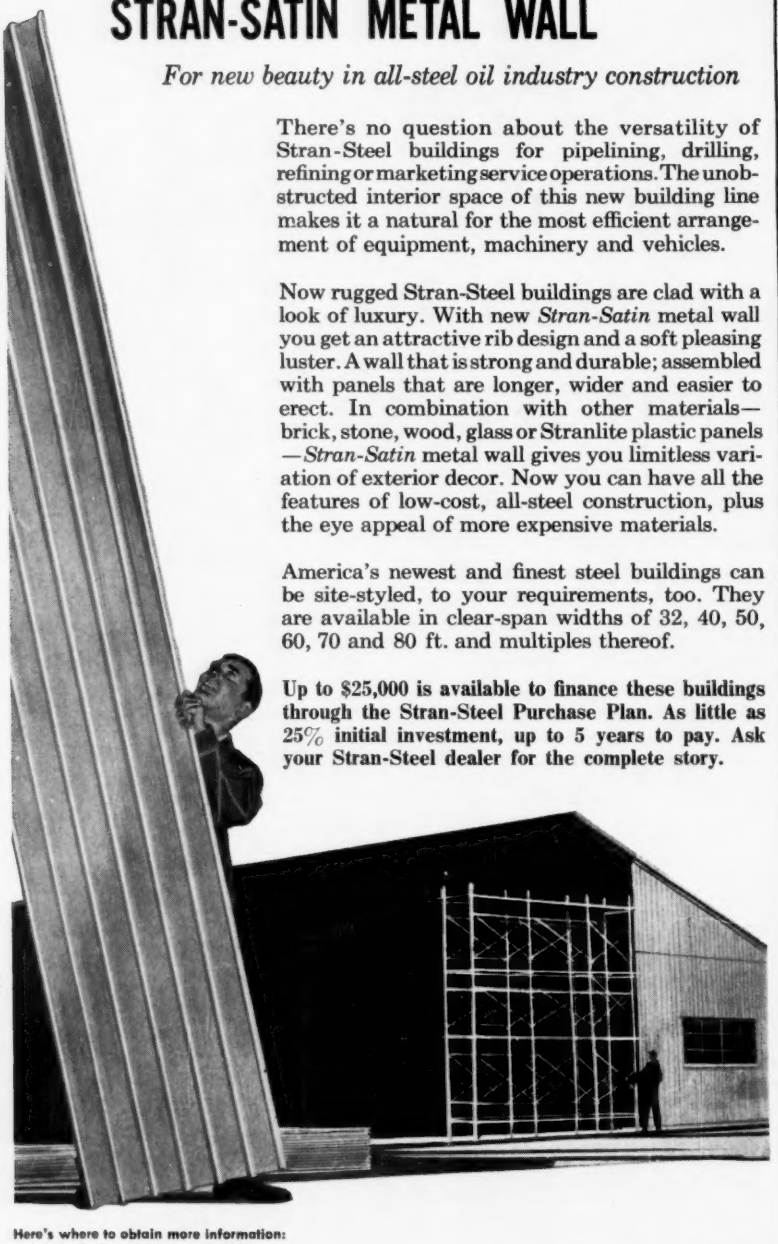

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OPINION

Kroll Supporter

TO THE EDITOR: . . . David Cort published in *Nation* (*Dec. 8, '56*) an article on the same subject mentioned in your interview with me . . . in CHEMICAL WEEK (*Sept. 15, '56*) namely, on . . . individual research as compared with that performed by team work. This article is excellently written, and it confirms my viewpoint.

Mammoth laboratories are not going to replace the work of individuals who will still be on the job to open new roads, even if they are going to be crowded by the research staffs of government and corporations.

W. J. KROLL
Corvallis, Ore.

Chemicals Like Autos?

TO THE EDITOR: While Mr. Ernest Dale's comments (*Dec. 1, '56, p. 44*) on . . . sales forecasting may bear the stamp of authority, the statements concerning commercial chemical development, research, and pilot plants indicate Mr. Dale's authoritativeness does not extend to these areas.

To quote Mr. Dale, "The chemical industry is not as lead-time conscious as the automobile industry is, and companies at times don't keep very rigidly to schedules in bringing out a new product." To compare the chemical industry to the automobile industry is to ignore several differences so fundamental as to invalidate such comparison.

1. In the automobile industry a new model is brought out approximately every twelve months. In the chemical industry new products are brought out on a random basis and not necessarily in the fall of the year.

2. The end product of the auto-

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

mobile industry ends up unchanged and in the possession of the ultimate consumer. The end product of the chemical industry (as a rule) is purchased by an industrial user and its nature is substantially altered when it is sold to the ultimate consumer.

3. The new model of the automobile industry is not a new product: it involves relatively minor, albeit expensive, changes in tooling. The new product of the chemical industry is precisely that and usually involves new capital facilities.

The conclusions to be drawn from these three differences are somewhat obvious. There is, however, another attitude implicit in three additional statements of Mr. Dale:

"There's a tremendous time and financial gap between invention or product improvement, the pilot-plant stage, mass production and commercialization.

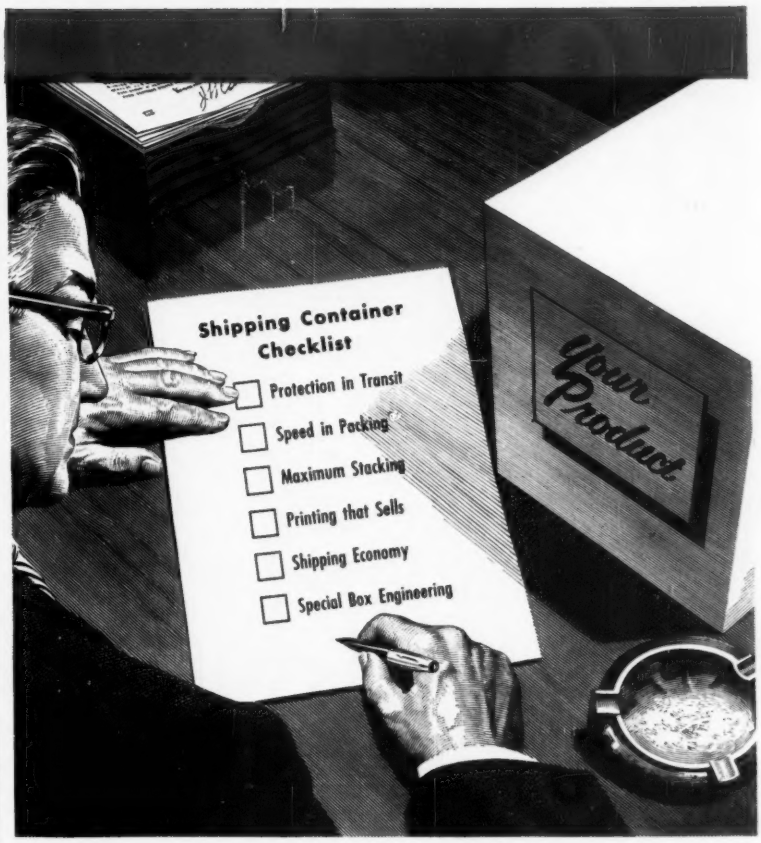
"There's a certain failure, I notice, to grasp the great difference between small-scale and large-scale production.

"They rely on others, they don't finish anything on time, (referring to research personnel) and can't solve the big problem."

The implication of these statements is that there is too great a time lag between invention and commercialization; that development personnel are unaware of the problems posed by the unavailability of a new product in commercial quantities; that many research people cannot finish an assignment on time.

A volume could well be written on these subjects, but here are a few pertinent comments. With respect to the time lag and unawareness, management has been so concerned with the lag that it has leaned over backwards in demanding a telescoping of this time. Where it exists, this policy has often resulted in plants which are either inoperable or else require excessive start-up time and expense. How many presidents are saying in their annual reports "nonrecurring costs due to starting up our new plant in Speedup City"?

With respect to the incompetence of many research personnel, I suggest that a director of chemical research who hands out assignments for completion in a given time will



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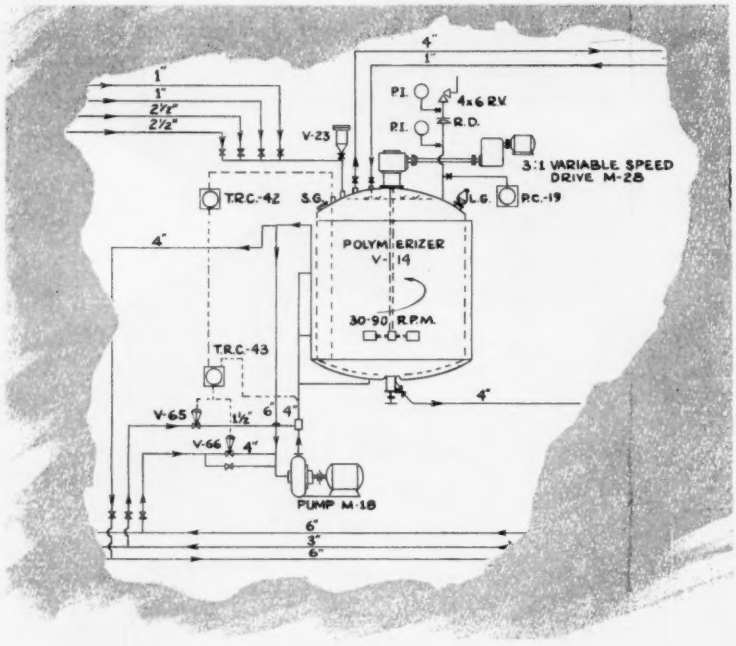

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OPINION

have [an extremely short] tenure of office. . . . Research, to a major degree, and pilot-plant development, to a lesser degree, do not lend themselves to firmly established schedules.

For someone who demands a more accurate quantitative expression (in marketing), Mr. Dale's statements on commercial development are too sweeping and too broad a group of generalizations to be given serious consideration.

E. R. SWEET
Singmaster & Breyer
New York

TO THE EDITOR: Mr. Sweet's apologetic and apoplectic defense of chemical research may make his clients feel better . . ., but it is not likely to contribute to more profitable financial statements at the end of the year.

The chemical industry's research resembles that of the automobile industry in that much of it is in the nature of advanced engineering work. This is not of the genius variety of revolutionary innovation, but an extremely important activity that has to pay for itself in the long run. It is not of the "Ad Kalendas Graecas"* variety, but can be approximately timed.

That it must be timed is obvious, because manufacturing and marketing staffs have to be assembled, advertising campaigns planned, potential customers interested, etc., all in advance of the finally commercialized product. If the applied researchers are repeatedly unable to meet the deadlines which they themselves help to set up, they will be forced out of business or must be carried by other activities of their company. . . .

ERNEST DALE
Professor
School of Business
and Public Administration
Cornell University
Ithaca, N.Y.

**At the (non-existent) Greek calends; i.e., never.*—ED.

Distorts, Doesn't Burn

TO THE EDITOR: [Re] . . . the advantages of PVC for windows (*Nov. 3*), I do not doubt any of the properties attributed to this material with the small exception of fire resistance. Your readers may incorrectly interpret

...and one for the pot!

Witches of old brewed heroic broths to encourage visions, prognostications, spells, and spasms. Even unrequited love yielded to these near-lethal potions. Add the tail of a cat, the ear of a rabbit, sixteen varieties of tree roots, and a few "trigger" ingredients, known only to the witches guild . . . and stand back!

Folklore ignores the witches' maintenance problems, but such overwhelming corrosives must have liquidated many a cauldron inventory. After all, the witches had no titanium.

Titanium is available today, and it is the most promising metal for the chemical, textile and pulp industries . . . or any place where severe corrosion presents forbidding maintenance or design problems.

Titanium is inherently passive to such vicious corroding agents as ferric, cupric, stannic and mercuric chlorides, and the hypochlorites. There is even little or no pitting or localized attack — a source of difficulty with practically all other metals. Stagnant conditions, surface deposits, fouling marine organisms and moist salt crystals are not troublesome to titanium. Strongly oxidizing agents in high concentrations and at high temperatures are readily handled with titanium. Slight additions of oxidizing agents to sulfuric, hydrochloric or phosphoric acid inhibit attack.

Titanium tubing, sheet, strip, plate, extrusions, bar and billet are all available from T.M.C.A.— and prices are dropping to competitive levels. T.M.C.A. technical service is available upon request.

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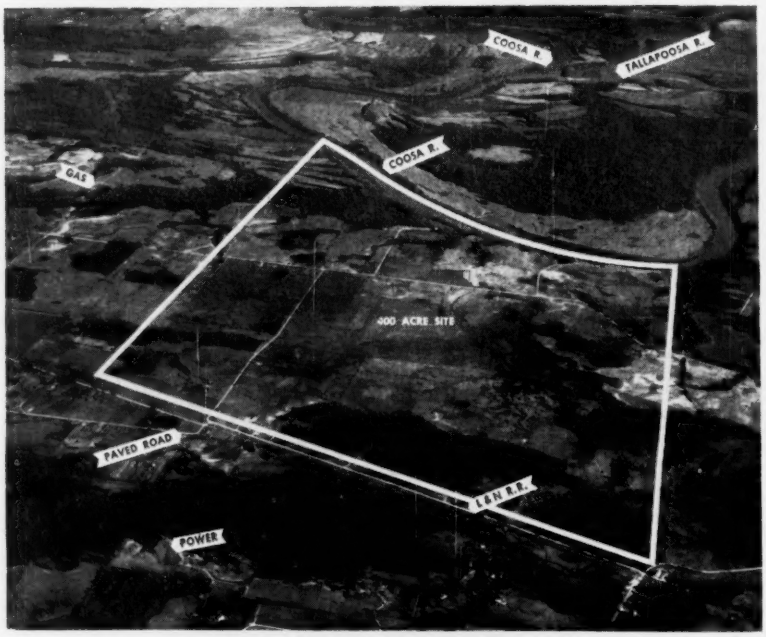

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LOUISVILLE & NASHVILLE RAILROAD

OPINION

your meaning and assume that the material is really resistant to fire. While polyvinyl chloride will not in itself burn, it certainly is subject to distortion from heat. Therefore, the claim of fire resistance is not exactly true.

T. A. VENTRONE
American Cyanamid Co.
Bound Book, N.J.

Flammability is the characteristic we had in mind.—ED.

MEETINGS

American Society for Testing Materials, annual meeting, Benjamin Franklin Hotel, Philadelphia, Feb. 4-8.

Society of the Plastics Industry, Inc., 12th Reinforced Plastics Division conference, Edgewater Beach Hotel, Chicago, Feb. 5-7.

American Management Assn., conference on managing the atom, Statler Hotel, New York, Feb. 7-8.

American Pharmaceutical Manufacturers' Association, Central section meeting, Edgewater Beach Hotel, Chicago, Feb. 11-13; Western section meeting, Ambassador Hotel, Los Angeles, Feb. 18-19.

Technical Association of the Pulp and Paper Industry, 42nd annual meeting, Hotel Commodore, New York, Feb. 18-21.

American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., annual meeting, Hotels Roosevelt and Jung, New Orleans, Feb. 24-28.

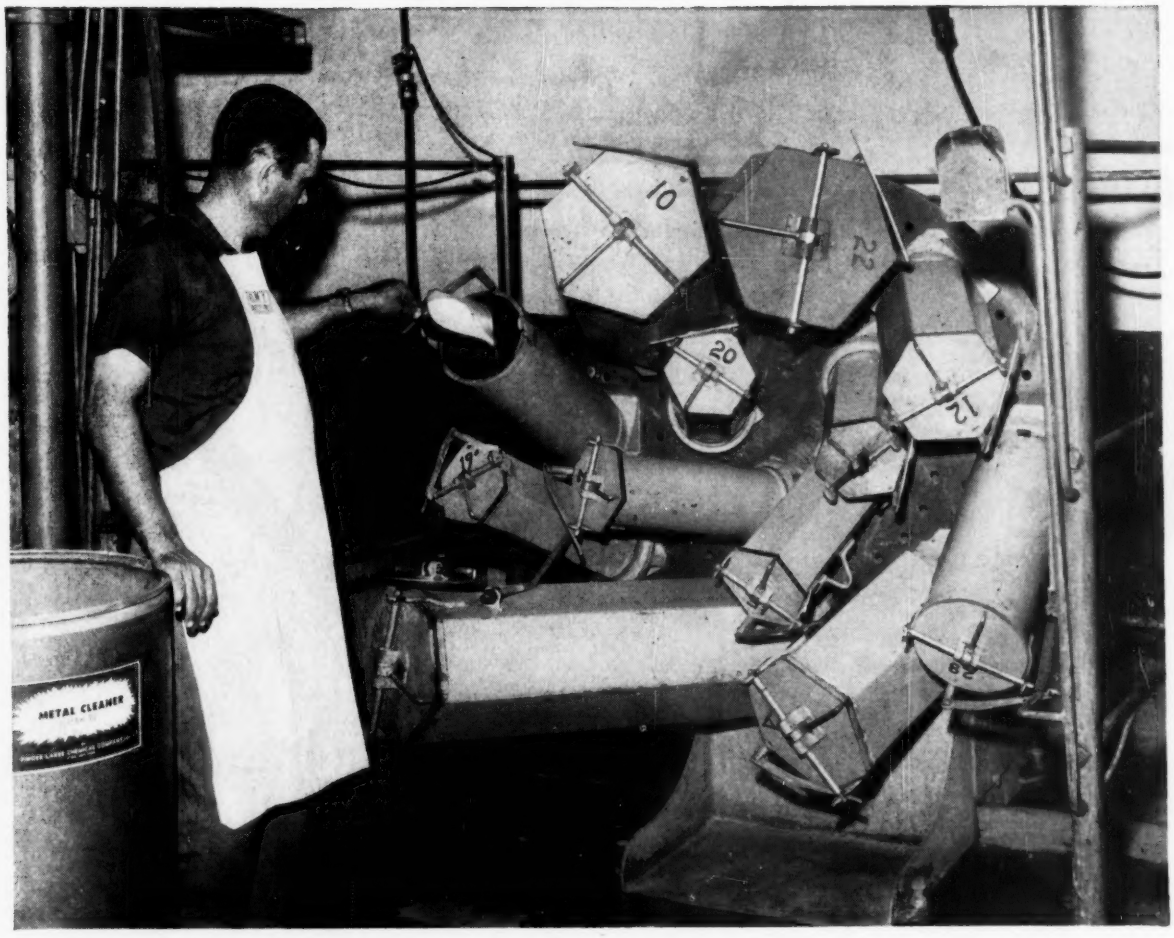
Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh, Pa., March 4-8.

National Agricultural Chemicals Assn., spring meeting, Fairmont Hotel, San Francisco, March 6-8.

Chemical Market Research Assn. Theme: Our next five years of competition with foreign chemical industry. Sheraton Hotel, Philadelphia, March 12-13.

Next Week

CW report author W. Cameron Caswell, of McKinsey & Co., New York, management consultants, analyzes compensation afforded top chemical management. His conclusion: compensation rates have not kept pace with those in other industries.



PRECISION METAL FINISHING—Tumbling compounds play a key role in barrel finishing. Here, Lakeseal Metal Cleaner, based on CMC, is being added to tumbling barrels at BMT Manufacturing Company. Lakeseal Metal Cleaner is a product of Finger Lakes Chemical Company, Ithaca, New York.

Barrel Finishing Costs Tumble with CMC

The selection of the right tumbling compound in barrel finishing improves product quality and lowers manufacturing costs. The value of Hercules® CMC in barrel finishing compounds serves as another example of the wide usage of this versatile chemical ingredient. Finger Lakes Chemical Company has found that the use of CMC for suspension and lubrication in its Lakeseal Metal Cleaner results in an improved metal finishing operation.

Perhaps CMC holds the key to improvement of one of your existing products. As a viscosity control agent, water binder, suspending agent, or film-former, CMC has been finding applications in industries ranging from textiles to paper, ceramics to detergents.

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SHELL

Business Newsletter

CHEMICAL WEEK
February 2, 1957

Is the prediction of higher sales and lower profits holding true for chemical companies? The 1956 financial reports out this week seem to bear it out—but there are some firms that buck the trend.

Among the exceptions: Air Reduction, with sales of $170 million in '56, up 14% over '55, had net earnings of $16 million, up 36% over '55. Foote Mineral Co., whose '56 sales were over $24 million, a boost of 24% over '55, saw a profit per share about 60% above the '55 level.

On the other side: Allied Chemical, Monsanto and Catalin Corp. They set sales records, but saw drops in net profit. Allied (*see also p. 22*) had '56 sales of nearly $669 million (up 6% from 1955's $629 million); its net income was $47 million in '56, a 10% slump from the '55 figure. Monsanto's sales in '56 hit almost $542 million (4% over the previous year's $522 million), but its net dipped about 7%, to $39 million. Among smaller firms, Catalin's sales reached nearly $22.5 million (10% over '55) while net income was down almost 34%, to $390,627.

•

Chemical companies facing wage negotiations may be affected by a decision handed down last week by the U. S. Supreme Court.

The court ruled that a strike by a union at a wage reopening during the life of a contract is always legal, provided that 60-day notice is given before striking. There had been some uncertainty whether such notice was enough, due to ambiguity in Taft-Hartley law phraseology.

A lower court had said this meant a union could not strike for money or fringe benefits during the life of a contract. The high court decision allows strikes any time that wage levels are being re-examined under a contract. The case stemmed from a 1952 controversy between Lion Oil (since merged into Monsanto Chemical Co.) and the CIO Oil Workers (now a part of the AFL-CIO Oil, Chemical & Atomic Workers).

•

Magnet Cove Barium Co. won't continue its appeal of that Arkansas natural gas rate hike, which is being fought by a number of other firms, including Alcoa, National Lead, Columbian Carbon, and Monsanto. At issue is an action of the state's public service commission, which, in 1955, okayed a boost from 14 to 18¢/1,000 cu. ft. for gas sold by Arkansas Louisiana Gas Co.

Magnet Cove, too, has just signed a "Three-X" gas contract with Ark-La through which it pays a rate higher than the 18¢ paid by most industrial firms, but has an assured gas supply in cases where gas flow is reduced. It was the Three-X contract signed by Reynolds Metals

(*CW Business Newsletter, Dec. 29, '56*), that caused Alcoa to charge Reynolds with illegally obtaining preferential treatment. Alcoa's appeal to the Arkansas PSC on the preference matter may well overshadow the older appeal on the subject of basic gas rates in Arkansas.

•

A new plan for selling the government-owned alcohol butadiene plant at Louisville, Ky., will likely be adopted by Congress soon. The plan may finally allow sale of the costly "white elephant."

Key feature of the new plan, swiftly okayed by the House Armed Services Committee last week, is the proposal to allow conversion of the facility to the manufacture of any of some 100 chemicals that fit into the nation's mobilization base.

It's this feature that enhances the plant's value to prospective buyers. Nearly 20 companies have expressed serious interest in buying the plant, reports the Federal Facilities Corp. chief negotiator, Eugene Holland, on condition that it could be converted to manufacture of chemicals other than alcohol-derived butadiene.

Congressional acceptance may be speeded by the hope of eliminating the plant's maintenance cost to the government, plus assurances of adequate over-all U. S. butadiene supplies, even if the plant is converted.

•

First commercial gibberellin-containing fertilizer is now being offered to gardeners on a mail-order basis. Fertl Inc. (South Norwalk, Conn.) has introduced a soluble plant food combination that contains gibberellin produced by Imperial Chemical Industries. Novel way of introducing the minute amounts of the compound to plant soil: a solution of the gibberellin is soaked up by a blotter, which is then dried and packed in the container, along with dry plant food materials. When water is added to the container by the consumer, the growth stimulator and plant food go into solution.

•

The federal court jury that heard the government's antitrust action against Union Carbide and Vanadium Corp. of America (*CW Business Newsletter, Jan. 19*) was dismissed last Saturday night, after it failed to reach a verdict. Raymond Carlson, one of the government attorneys, told *CW* the government would ask for a retrial; Morrison Shafroth, a defense counsel, said he would file a motion to dismiss the charges.

•

Organizing nonunion chemical plants is tougher than ever says Oil, Chemical & Atomic Workers Union Chief O. A. (Jack) Knight, while commenting to a *CW* staff reporter in Miami this week. Out of 22 nonunion plants picked as organizing targets a year ago, only one has been unionized so far. Chances of a favorable union vote in an election at a second plant are not considered good.

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Why this is a good time to review your purchasing strategy on alkalis

Now you can purchase any of these three alkali chemicals from Hooker.

If you're buying more than one of them, there's a good chance you can get the economy of mixed-carload or mixed-truckload deliveries from Hooker.

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How your Hooker salesman can help you

Your process requirements may have reached the point where a change in alkali form, grade, or strength will spell savings for you.

Your Hooker salesman can provide the facts and figures to help you determine whether such a change is in your best interests.

He's intimately familiar with the economics of these alkalis. He can relate to your needs the most advantageous of 16 different forms and grades of caustic soda; 13 forms and grades of NIALK® caustic potash; five forms of NIALK carbonate of potash.

Perhaps a change in *packaging* will make handling easier and less costly for your production people. (For example, you can buy Hooker flake caustic soda in a new drum with 65% larger opening for faster, easier emptying—without paying a premium price.)

In many other ways, your Hooker salesman can help you take full advantage of the modern supply facilities he represents. He's an important member of a team that's supplying a substantial part of U.S. caustic soda, caustic potash and carbonate of potash requirements.

This is a good time to put his experience to work for you. If you'd like swift, competent help in improving your alkali supply position just write or phone the nearest Hooker sales office today.

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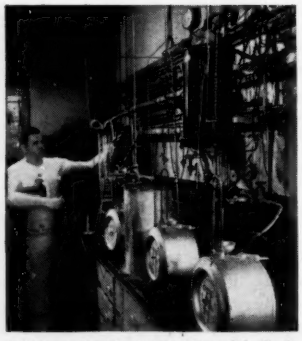
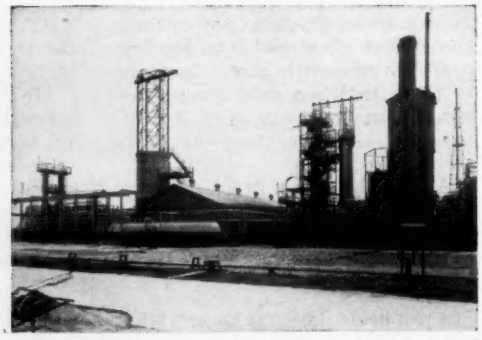
HAVE A PROBLEM? This infrared spectrophotometer is typical of the advanced equipment used in Girdler's Analytical Laboratories to help solve knotty problems encountered by our customers and to monitor the quality of our production.



NEED A BETTER CATALYST? Girdler's highly skilled development staff constantly works to create new catalysts or improve existing ones. Result: more production, less cost for Girdler customers.



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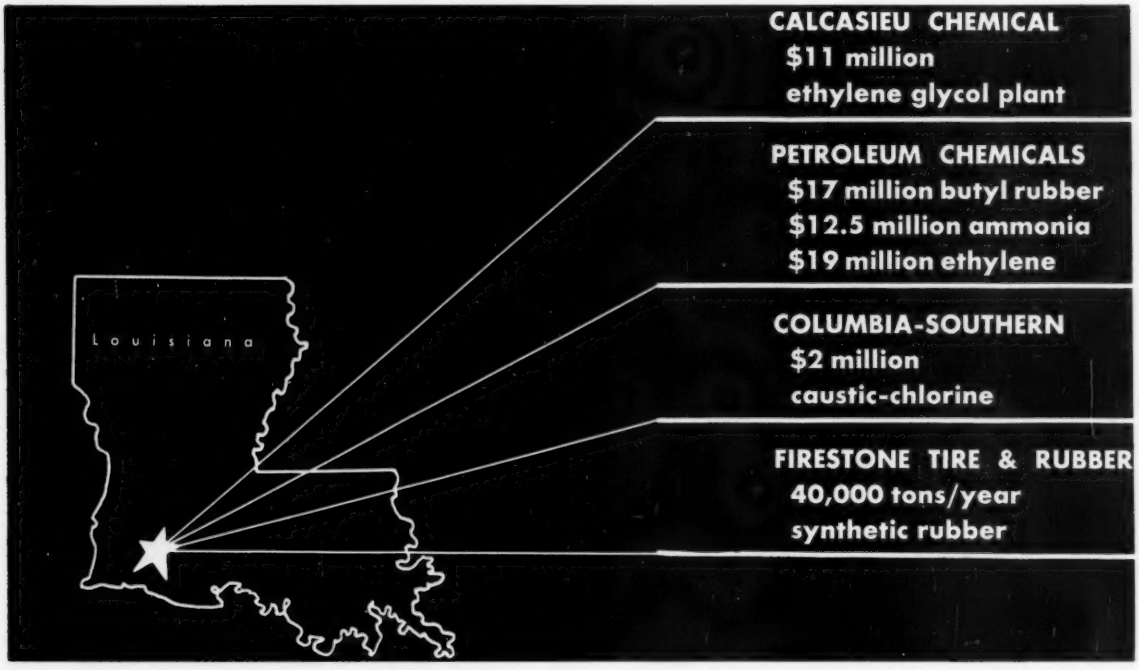


Pacing the Lake Charles Boom

Lake Charles, La., is in the midst of a chemically inspired boom that could make it one of the largest petrochemical centers of the Southwest—indeed, of the U.S. In the past 18 months, this sprawling town in the state's southwestern corner has more than doubled in population (from 42,000 to 90,000), already boasts chemical processing plants representing an investment of over $250 million (*see table, p. 22*).

And just last week came news of two more plants—Petroleum Chemical's $17-million butyl-rubber plant, and Calcasieu Chemical Corp.'s $11-million ethylene glycol unit that will bring the total to nearly $300-million. See above for other expansion under way.

These are the area's lures:

- A plentiful supply of fresh water, plenty of electric power. Lake Charles is the hub of Gulf states' utility power system. And it's on the intracoastal waterway.
- Ten-year tax exemption that Louisiana grants companies building in the state. (More than 22 companies have applied for this exemption this year.)
- Recent increase in "oil allowables"—permitting more oil to go to the petrochemical industry, without cutting back supplies to fuel buyers.

But Calcasieu, a newly formed* company, has other reasons for choosing Lake Charles. Its $11-million unit, designed to produce 800 million gal./year of ethylene glycol, will be next to PCI's giant new ethylene plant.

Already under construction, PCI's plant will draw its raw material from the hydrocarbon streams of the nearby refineries of Cities Service and Continental Oil.

Common Background: Calcasieu (named for the home parish of Lake Charles), moreover, has a closer tie with PCI than mere location: Cities Service and Continental Oil (the companies that own PCI), along with Sears Roebuck & Co. and Mineral Solvents Co. (Chicago) are large Calcasieu stockholders.

Like PCI's other petrochemical units at Lake Charles, the butyl plant will draw its raw materials from the refineries of Cities Service and Continental Oil. Due to be completed by Jan. '59, it will be the first butyl plant built since the war. It will mean, incidentally, that Esso will be able to keep its Baton Rouge butyl plant.

Esso had acquired this plant from the government in April '55. But one of the conditions was that Esso sell it to anyone who wanted to buy within three years (deadline: April '58)—provided nobody built another butyl plant. Now that PCI is building a butyl plant, Esso may reject any and all purchase offers.

Plenty of Company: Besides Calcasieu and PCI, plenty of others are building at Lake Charles. Columbia-Southern's $2-million expansion of caustic-chlorine capacity

*Calcasieu was incorporated in Delaware on Nov. 30, '56, and authorized to do business in Louisiana by the Secretary of State on Dec. 3, '56. It has issued 3 million shares of stock—2,790,000 shares of Class A common and 210,000 shares of Class B common—both with a par value of $1. R. E. Brooker, a vice-president of Sears Roebuck, is president.

is just about finished, will be operating within a month or two. Firestone's 40,000-tons/year GR-S expansion, scheduled for completion this month, will bring total capacity at Lake Charles to 190,000 tons/year. And Lake Charles Chemical's $6.2-million coking plant is due for startup in September.

If the present rate of building continues, Lake Charles might soon be vying for honors as one of the biggest petrochemical centers in the U. S. Louisiana itself now ranks second in new chemical construction.

Major CPI Investments at Lake Charles

PETROLEUM CHEMICALS INC.

$21-million, 80,000-tons/year butadiene plant
$19-million, 200-million lbs./year ethylene plant, due Jan. '58
$17-million, 30,000-tons/year butyl plant, due Jan. '58
$12-million, 300-tons/day ammonia plant, due Jan. '58

CALCASIEU CHEMICAL CORP.

$11-million, 800-million gal./year glycol plant, due Jan. '58

CIT-CON OIL CO.

$42-million paraffin and lubricating oil refinery

CITIES SERVICE

$80-million refinery

COLUMBIA-SOUTHERN CHEMICAL CORP.

$40-million caustic-chlorine plant, $2-million expansion, due Feb. '57

LAKE CHARLES CHEMICAL CORP.

$6.3-million coking plant, due Sept. '57

FIRESTONE TIRE & RUBBER CO.

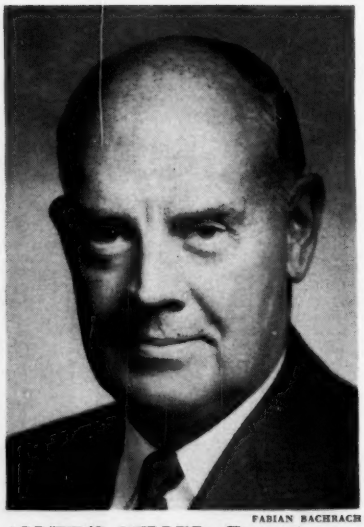
$11.7-million, 150,000-tons/year GR-S plant, 40,000-tons/year expansion, due Feb. '57

LONE STAR CEMENT CORP.

$13.7-million cement plant

OTHER PLANTS:

Olin Mathieson, soda ash; Davison Chemical, catalysts; Newport Industries, resins, turpentine; Crosby Chemical, resins, turpentine; Virginia-Carolina Chemical Corp., fertilizers; Continental Black Inc., carbon black; Magnet Cove Barium Corp., drilling muds.



FABIAN BACHRACH

ALLIED'S MILLER: For extra capacity, low-pressure polyethylene.

Allied Preps for L-P Polyethylene

Allied Chemical will venture into production of low-pressure polyethylene plastics "sometime in the not-too-distant future," Senior Vice-President Glen Miller told an investors group in New York last week.

The company will use a process it has been researching for more than 10 years at its Morrisville, N. J., research facilities. Production will be at its Semet-Solvay Division's plant at Tonawanda, N.Y., where, Miller says, there's more ethylene capacity than is needed for production of polyethylene wax emulsions, which Allied has sold for several years.

The firm has developed a number of markets for its waxy polyethylenes, notably as an extender for conventional polyethylene plastic, for use in coating food containers, for floor-polish manufacture and for textile finishing. Now, the company says, its intermediate pressure polyethylene operation is "no longer a drag" on the firm's earnings. As a result, Allied is looking ahead to new polyethylene ventures.

Income Picture: Allied's sales and other income in 1956 amounted to $669 million—an increase of 6% over 1955, Miller reports. But net income dropped 10% from 1955, to $47 million, largely because of excessive start-up costs for the firm's caprolactam nylon plant, other increased operating

costs, and heavy depreciation charge-off.

Allied expects its earnings picture to improve considerably in 1957; its sales during the fourth quarter of '56 were 11% better than the corresponding 1955 quarter. Now, having boosted prices on many items, with better operating ratios in sight for new units, and with lower depreciation charges scheduled for coming years, Allied looks for an appreciable increase in its net profit.

Money to Grow On: The company plans to spend some $77-80 million for new facilities in 1957, slightly more than the $76.7 million it spent in 1956. In addition to investment in facilities for polyethylene plastics, at least $20 million will be applied to Allied's joint titanium venture with Kennecott Copper, and additional expenditures will be made for the firm's new uranium hexafluoride plant, which will supply the Atomic Energy Commission with high-purity material for atomic programs.

Also slated for construction in '57: units to produce hydrofluoric acid (Valleyfield, Que.), sulfuric acid (Elizabeth, N.J.), refined anthracene (Ironton, O.), and phthalonitrile (Edgewater, N.J.).

Allied and Kennecott hope their jointly-owned company can start construction of its titanium plant next summer, after a site has been chosen. Miller says that once this choice is made, engineering of the plant can proceed without delay. In starting operations, the company, Miller reports, will purchase, rather than produce, the sodium needed in its continuous process for producing titanium sponge from titanium tetrachloride.

Nitrogen: Miller predicts a sounder outlook for nitrogen and ammonia than has pertained for some time. World capacity for making the products is expected to be about 10 million long tons by the middle of next year, compared with consumption of about 8 million long tons. In the U. S., he says, capacity is about 4.5 million long tons or 66% more than the annual consumption last year of about 2.7 million. He hopes this situation will improve.

Allied spent $17 million on research in 1956, more than triple the $5 million it spent 10 years ago. Additional research facilities are included in the upcoming research expenditures.

WIDE WORLD

INSPECTION: President Eisenhower cites need for research and credit as . . .

Farmers Seek More Help

Emergency legislation to aid drought-and poverty-stricken farmers —under Congressional committee study this week—highlights two issues of broad interest to segments of the chemical industry.

- Research on means to combat drought and its consequences.
- Extension of credit to tide farmers over depressed periods.

The President—who saw conditions first-hand during a recent trip to drought areas of the Southwest—has asked both government and private interests to step up activity on both counts.

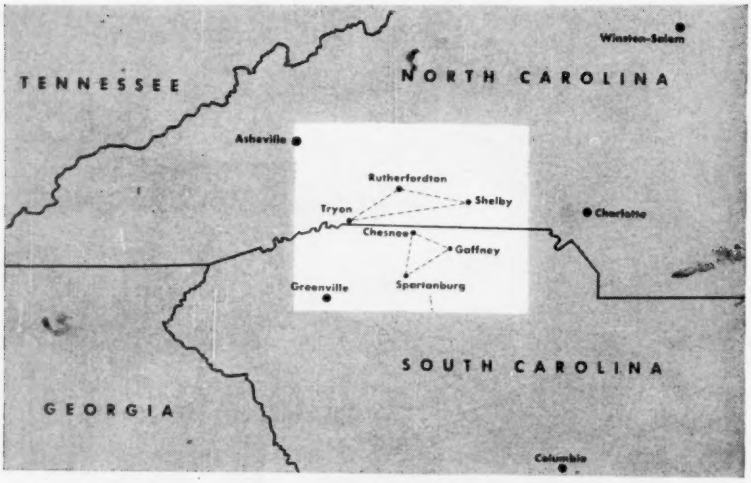
Research: Agricultural chemical manufacturers generally agree that they won't immediately step up research programs beyond present efforts. For the most part, these companies are already actively supporting information and education programs for farmers, and financing research fellowships at colleges and universities. Beyond that, they say, conservation is a matter of government effort.

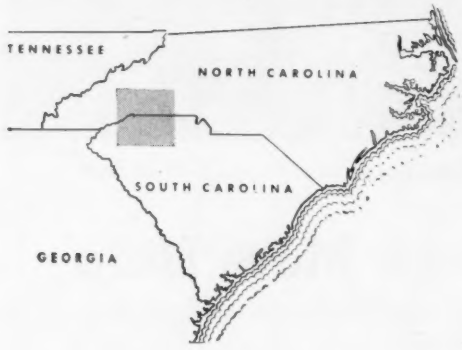
Companies acknowledge that they know of no radically new chemicals being marketed or researched for the purpose of minimizing drought effects. Some evaporation retardants for reservoirs (e.g., cetyl alcohol) are under study.

Some materials already in use contribute to land and water conservation. These include polyethylene film used to line reservoirs to prevent seepage, fertilizers for soil-anchoring crops, and agents that produce wind-resisting crusts on loose soil.

Credit: Farm chemical makers report that they have been worried for some time over increasing demands placed upon them for credit extension. Already, many are stepping up accounts receivable collections, liberalizing discounts to encourage payment during the buying period rather than the consumption period. These steps do little to solve basic problems of improving the farmer's financial condition. But, after all, what can chemical firms do to help farmers increase their income aside from providing basic information to promote stepped-up productivity?

Thus, chemical makers conclude that they are already deeply immersed in research and credit activities promoting agricultural aid. Result: most farmers will depend upon local, state and national government agencies to promote additional help.





Searching sites are centered in two states, as metals producers push . . .

Carolina Alumina Hunt

Aluminum and lithium producers are eyeing areas in the Carolinas which may yield this country's biggest domestic alumina find.

Piedmont Properties Inc., a newly-formed land speculation company believed to be closely tied to big domestic metal-processing firms, is doing the exploring. Its geologists are sending samples back to the company's Spartanburg, S. C., labs for analysis—but no one is yet saying what's been found.

The areas under Piedmont's investigation are located in both North and South Carolina, near the center of the border between the states (*see above*).

Boon for Farmers: Meanwhile, the area's farmers, who own much of the land now being explored, have been flooding the offices of state geologists in both Raleigh and Columbia with land samples for analysis. Reason: Peidmont Properties has offered to buy their farms at prices up to $200/acre. Assay of almost every sample has shown 16-17% alumina in the red and white clays.

Although this is not generally considered a high percentage of useful alumina, new processes under development may make it feasible to refine the ore. Anaconda Copper has built a pilot plant in Montana, which inexpensively renders low-grade bauxite suitable for use as prime alumina.

The less-abundant white clays are drawing bigger offers from Piedmont, state geologists report, presumably because iron ores combined with alumina in the red clays pose a troublesome separation problem for potential processors.

Others reported to be working on similar projects: Kaiser and Alcoa.

Competition Ahead: Foote Mineral Co. and Lithium Corp. of America both have large plants in the area. Both are mining veins of spodumene that run through the border region. These companies' holdings presumably include land containing alumina clay.

When asked whether his firm was thinking of diversifying into aluminum, a Lithium official said: "We're definitely investigating the possibility."

Rumors concerning the exploration are plentiful in the surrounding Carolina communities. Some say that two $40-million plants are now on the drawing boards, one each for North and South Carolina. Presumably, they would be built near the areas under investigation. Who would build them is just as indefinite, although Anaconda has been mentioned as a strong possibility.

More Power to Them: But such rumors seem not overly farfetched. Local power companies have already shown some concern over supplying big, new customers. Power in the area is already on an interruptible basis, and if big plants come in, the area would be faced with a serious shortage.

Duke Power Co., which serves most of the border section, last week met with Atomic Energy Commission officials to discuss the feasibility of an atomic power plant in the areas. And the company has still other conferences, including one at Oak Ridge, on its agenda.

Identity of Piedmont Properties Inc. has been and still remains a mystery. Efforts to contact top officials of the company have met with no success—they are always reported to be "out of town." What is known is that the company was incorporated only last year in Atlanta, Ga., has its main laboratories in Spartanburg. The three incorporators, named in official state records, are Devereaux F. McClatchy, George B. Haley, and Sydney Haskins. All three are prominent Atlanta lawyers, have no apparent connection with any metal-processing firm.

The identity of the owners is of little importance to Carolina folk. More important to them is the big money being offered for their properties and the decision whether to sell now or hold out. Piedmont's goal reportedly is 60,000 acres of the land, which it would resell or turn over to aluminum interests.

In all that's going on, optimistic Carolina businessmen see the start of a big industrial boost for the area. And, so far, nobody's stepped forward to deny the possibility.

Washington Angles »

» Hopes for rapid write-off tax refunds were doomed last week by two U. S. Supreme Court decisions that said, in effect, that the government's World War II "partial" accelerated amortization program definitely did not cover the full cost of emergency plants.

The two decisions settled test cases—over which lower courts had split—that were brought by National Lead and Allen-Bradley Co. The companies argued that the War Production Board policy of granting fast tax write-off certificates on only a part of the cost of building essential war production facilities was void. They claimed the law entitled them to accelerate the amortization of the full cost of emergency facilities.

The Supreme Court action dooms to failure at least 40 other pending claims, involving upwards of $62 million in refunds.

» Maintenance work at the shale-oil research plant at Rifle, Colo., owned by the government, may go by the boards until budget allocations are determined.

The Eisenhower Administration's fiscal 1958 budget calls for the Bureau of Mines—rather than the Navy—to receive $213,000 in maintenance funds, even though the Navy has title to the plant. The Navy is currently paying the bureau to maintain the plant.

A Naval Petroleum Reserve spokesman says the situation could cause a halt in the plant's maintenance program.

Meanwhile, a Navy plan now being worked out would call for research to be done at the plant by a private contractor who would be paid some $2 million annually for five or six years.

» Leadership changes in Senate and Defense offices showed up last week. Sen. Estes Kefauver (D., Tenn.) was selected as chairman of the Senate Antitrust and Monopoly subcommittee, and Assistant Secretary of Defense Gordon Gray has been selected to replace Director of the Office of Defense Mobilization Arthur Flemming.

Selection of Kefauver bodes an active agenda for the committee in a wide variety of fields, including an industry-by-industry study of business concentration. First order of business will likely be Kefauver's pet "good faith" bill.

Gray, one of the few Democrats to enjoy high rank in the Administration, will hold Cabinet rank (though not membership) and will sit in on Cabinet meetings. He has had broad experience with the National Security Council and in military planning.

FOREIGN

Acetate/Japan: Ryoko Acetate Co. will build a 7.5-tons/day acetate rayon unit in Toyama. Cost: $7 million. The company was jointly set up six months ago by Mitsubishi Rayon and the U.S. Celanese Corp.

•

Caustic/Egypt: As part of its industrialization program, Egypt plans to build a 37,000-tons/year caustic soda plant at a cost of nearly $6.8 million. A government spokesman said Egyptian investors will finance the project.

•

Sodium Tripolyphosphate/Mexico: Monsanto Mexicana will build a $1.6-million sodium tripolyphosphate unit at Lecheria, near Mexico City, if the government approves a tax exemption request. The unit would be completed about Nov. '57.

•

Phthalic Acid/Germany: Badische Anilin (Ludwigshafen) and Gelsenkirchener Bergwerks (Gelsenkirchen) have built a new 1,000-tons/month phthalic acid plant near Bochum.

•

Polyethylene/Germany: Kohle-Oel-Chemie AG., jointly set up by Deutsche Erdoel (Hamburg), Mannesmann (Dusseldorf) and Farbwerke Hoeschst (Frankfurt) will build a new polyethylene plant near Gelsenkirchen. Cost: $23.8 million.

•

Potash/Germany: Salzdetfurth Potash Co. (Hanover) will offer stockholders new shares on a one-for-two basis, increasing thereby the company's share capital by 30,701,000 marks. Proceeds will be used to finance expansion and to pay off Salzdetfurth's share of a loan to a German potash syndicate.

•

Resins/Philippines: Resins Inc., an affiliate of Reichhold Chemicals Inc., is building a 6-million-lbs./year resins plant in Manila.

EXPANSION

Resins: Balfour-Guthrie & Co. has purchased a four-acre tract near Tacoma, Wash., on which it plans to build a $250,000 plant to supply adhesives for Pacific Northwest plywood processors.

•

Morpholine: Carbide and Carbon Chemicals will double the capacity of its morpholine producing unit at South Charleston, W. Va. New capacity will go onstream late in '57.

•

Montan Wax: A new company, Arkansas Chemical Co., has been organized at Malvern, Ark. The new firm, capitalized at $400,000, is blueprinting a plant to make montan wax from nearby deposits of lignite ore.

•

Sulfur: American Oil Co. will build a 50-tons/day sulfur recovery unit at its Yorktown, Va., refinery. Construction will be completed in late '57. Fluor Corp. is the engineer.

COMPANIES

Stauffer Chemical Corp. has integrated two wholly-owned subsidiaries, Nyotex Chemicals Inc. and New York-Ohio Chemical Corp., into the parent corporation, thus simplifying its organizational structure.

•

Western Natural Gas Co. (Houston) plans to acquire Cameron Parish Corp. (Chicago) through an exchange of stock. Terms call for Western to issue 800,000 of its common for all the Cameron outstanding stock. Shareholders of both firms will vote on the proposal early in February.

...AMONG SOME 3500 ORGANICS

About 150 miles up the west coast from Cape Comorin, the tip of India, there stands the town of Alleppey. The farmers around Alleppey raise black peppercorns for the world's pepper shakers. As a sideline they also raise a little ginger, and each year they also set out rhizomes (underground root-like stems) of a plant known to botanists as *Curcuma longa*. From the upper side of the rhizomes leafy shoots develop, and from the lower side, roots. At harvest time the farmers dig up the new crop of rhizomes.

These are then dried and milled to a yellow flour called turmeric, which is used to color the curries of India. Back in the old days a lot of turmeric went into the staining of leather, but chemistry killed that off long ago.

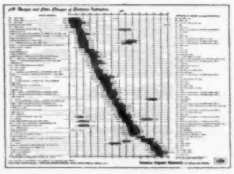
Some of the rhizomes do get shipped to a factory in Rochester, N. Y., which turns out mustard to put on hot dogs and hamburgers. Americans like their mustard to be a **bright, cheerful yellow** rather than its greyish-brown self. Turmeric imparts the preferred color and contributes a little flavor as well.

From the mustard people we buy modest amounts of turmeric and percolate hot acetone through it. In this simple manner we obtain sharp melting crystals of *Curcumin* (Eastman 1179), which is nothing more than 1,7-bis(4-hydroxy-3-methoxyphenol)-1,6-heptadiene-3,5-dione.

From an acidified solution containing boric acid and *Curcumin* one can obtain a red, alcohol-soluble reaction product, formed in proportion to the amount of boric acid present. There is a Ph.D. thesis in the archives of one of the midwestern universities which suggests that this red substance represents a loose combination of the borate radical with one of the two hydroxyls in *Curcumin*. At any rate, this reaction is the basis of a method for measuring boron in soils and plant tissue. We shall be pleased to send you an abstract of the method.

The big thing about *Curcumin*, however, is that it changes from yellow to red over the pH range 7.5 to 8.5 and from red to orange over the pH range 10.2 to 11.8. This gives it a place on the list of 52 *Eastman pH Indicators*.

Now, should you care to reveal to us that you are interested in pH indicators, do you know what we are going to do? We are going to send you ABSOLUTELY FREE a brand-new edition of our celebrated chart (suitable for framing) that shows the pH range and color changes of ALL the *Eastman pH Indicators*. That's what we are going to do.



From a large oil company, which knows better than to waste its own time on academic trifles, we received a request recently to make a little tert.-butyl methyl ether. We knew we couldn't do this by the usual Williamson ether synthesis because tert.-butyl halide splits off hydrohalide and turns into isobutylene. There are also newer methods using isobutylene as a starting material, but we decided on good old dehydration of alcohols with sulfuric acid.

Since the ether produced dissolves readily in water while butyl alcohol does not, all it should take to keep the dehydration from halting at equilibrium is to employ a method we have of continuously separating two immiscible liquids. We are particularly **fond of the method.** It was originally published in *J.A.C.S.* in 1920 (p. 366). One of its inventors is a venerable biochemist who first set us up in the synthetic organic chemicals business; another is a lady who still greets us with a card every Christmas; the third now sits on our board of directors as the vice-president in charge of manufacturing photographic materials.

But, alas, the story is spoiled. Because of the methanol needed for the methyl side of the ether, and because tert.-butyl alcohol differs physically from *n*-butyl alcohol, there is no neat two-layer separation but a homogeneous reaction mixture. This has to be steam-distilled to isolate the water-ether mixture, from which water and methanol are then removed by "salting out" with calcium chloride, with final purification by distillation.

Anyway, *tert.-Butyl Methyl Ether* and *tert.-Butyl Ethyl Ether* are hereby announced as Eastman 7313 and 7320, respectively.

How about this? We are prepared to supply some 63 different organic solvents in five-gallon drums. And we not only supply them but stand back of their identity and purity with as much firmness as we do small laboratory quantities. After all, it's no more time-consuming to analyze a sample from a five-gallon pail than it is a 1-gram bottle. You'll find these solvents listed on page 218 of our new "Eastman Organic Chemicals, List No. 40." Got your copy? If not, write *Distillation Products Industries*, Eastman Organic Chemicals Department, Rochester 3, N. Y.

DPi

Eastman Organic Chemicals

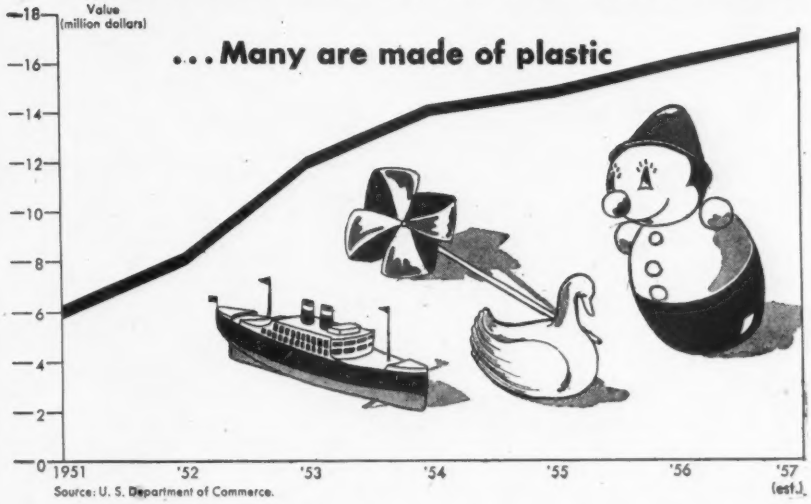
Also...vitamins A and E in bulk...distilled monoglycerides

Distillation Products Industries *is a division of* **Eastman Kodak Company**

Charting Business

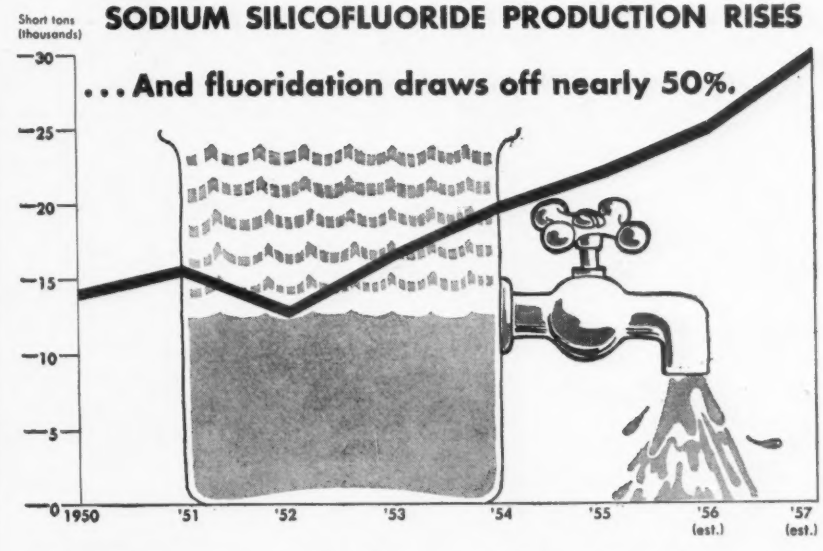
CHEMICAL WEEK
February 2, 1957

IMPORTS OF DOLLS AND TOYS ARE ON THE RISE



IMPORTS of dolls and toys into the U.S. are soaring; by this year, the value of these incoming items should hit close to $17 million—a three-fold increase over imports in '51. Since more than 75% of these products are fabricated from plastics, U.S. plastic producers, as well as toy makers, are concerned. Japanese exports to the U.S. amount to over 80% of our total imports of dolls and toys. And with the Japanese industry expanding rapidly, dollar value of such imports may well be increased. Other countries that claim an important part of the U.S. toy market: Germany, France, Great Britain.

SODIUM SILICOFLUORIDE PRODUCTION RISES



SWELLING DEMAND for sodium silicofluoride will boost production by the end of this year to an all-time high of 30,000 tons. In 1950, output was only 14,000 tons. Reason for the 100% jump: fluoridation of water—which now absorbs half of sodium silicofluoride output—is increasing at a brisk pace. Last year, 31 million people were using fluoride-treated water; in '50, only 1.5 million people were. Other outlets for silicofluorides: manufacture of laundry sours, vitreous enamel frits, opal glass and latex foam rubber.

Charting Business

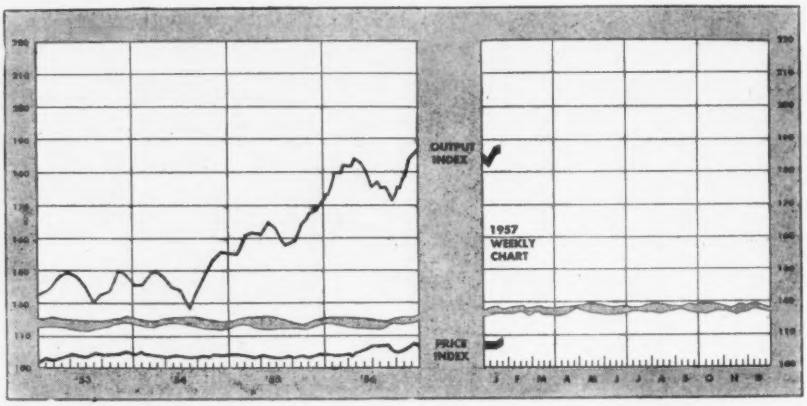
(Continued)

CHEMICAL COMPANIES FIGURE STRONGLY IN THE INCREASE IN ANNUAL TRADEMARK REGISTRATIONS.

Source: U. S. Trademark Association

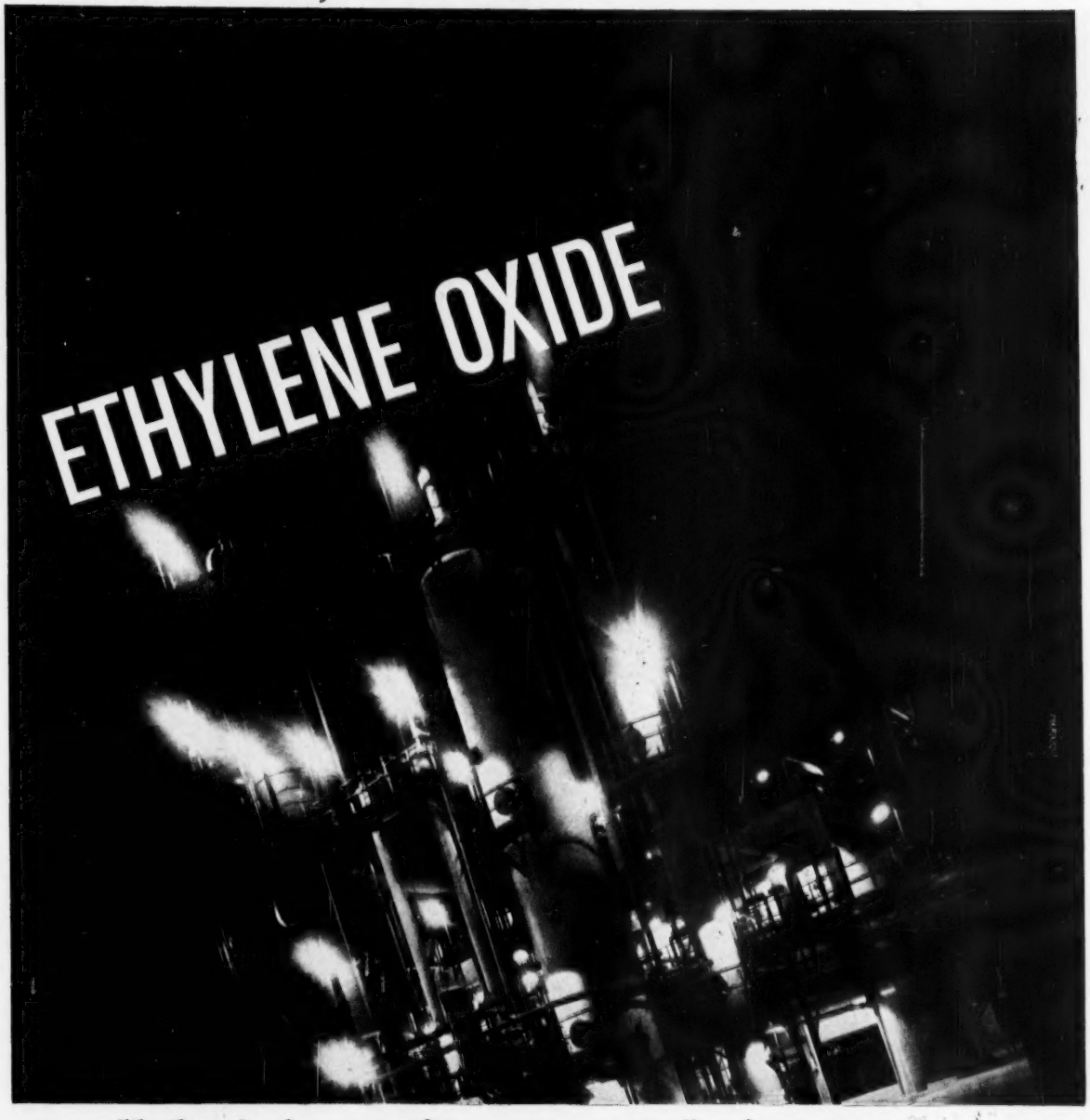
THE chemical industry is streamlining trademarks. Trademarks were recently modernized by American Cyanamid, American Cork and others. Socony Vacuum Oil is now Socony Mobil Oil; Consolidated Cosmetics became the much-publicized Lanolin Plus. Meanwhile, advertising campaigns for legal protection of trademarks were started by several companies: Du Pont for Orlon and Dacron; Owens-Corning Fiberglas for Fiberglas; American Viscose for Avisco. In 1956, a record of 20,778 trademarks were registered. A new record may be set in '57 as the Patent Office whittles down its backlog of applications.

BUSINESS INDICATORS



WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	185.5	187.1	180.0
Chemical Week Wholesale Price Index (1947=100)	108.2	108.3	105.1
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	415.0	422.2	461.3
MONTHLY Production (Index 1947-49=100)	**Latest Month**	**Preceding Month**	**Year Ago**
All Manufacturing and Mining	144	147	142
All Chemical Products	180	181	177
Industrial Chemicals	199	199	197

if you're considering its use . . .



get all the information you need—from one source . . . others have—with satisfactory results

Write for information on handling and storage, physical and chemical properties, literature studies, bibliographies, price quotations and samples of our material—the purest available commercially.

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Allied Chemical — Nitrogen Division

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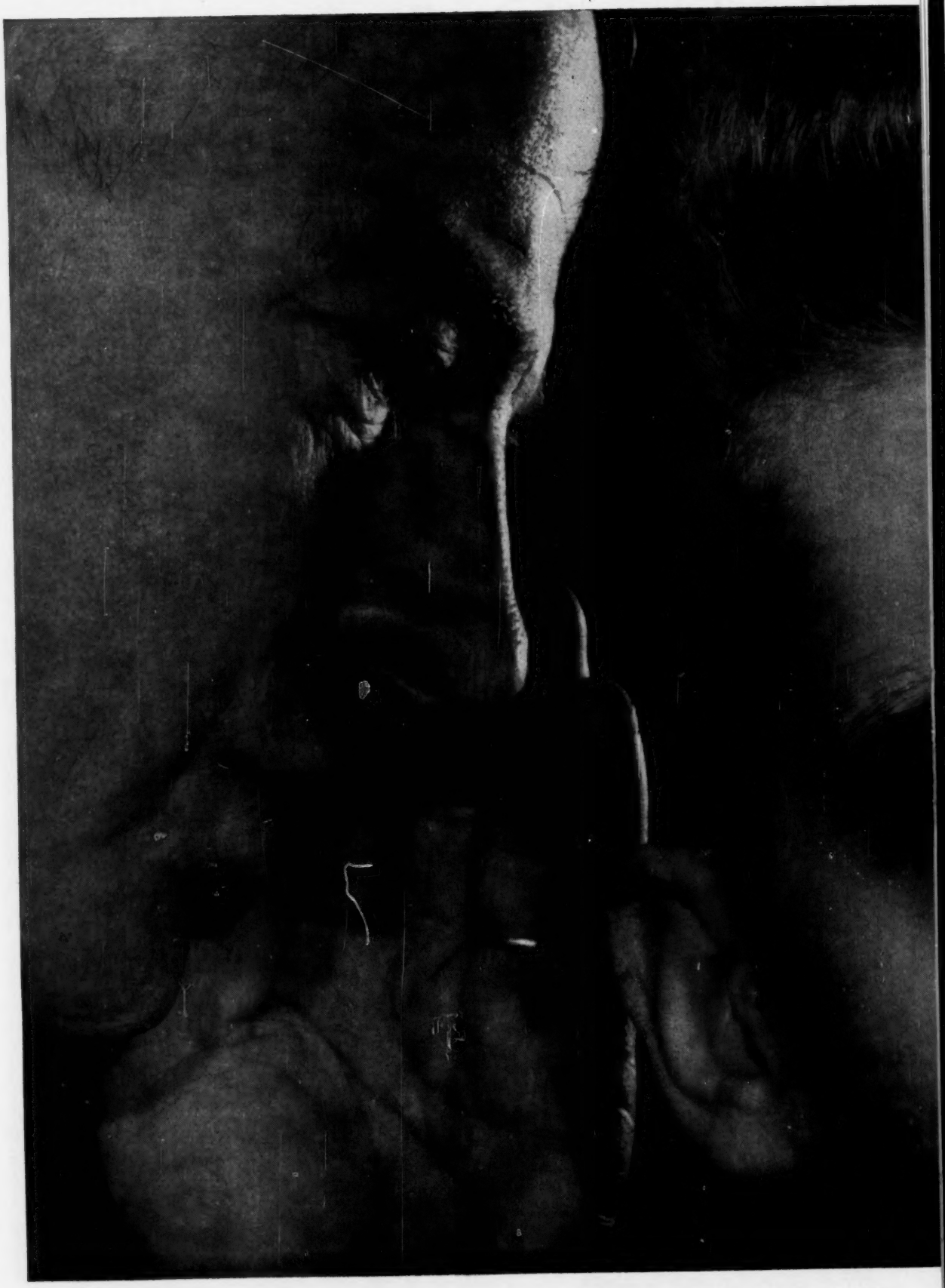
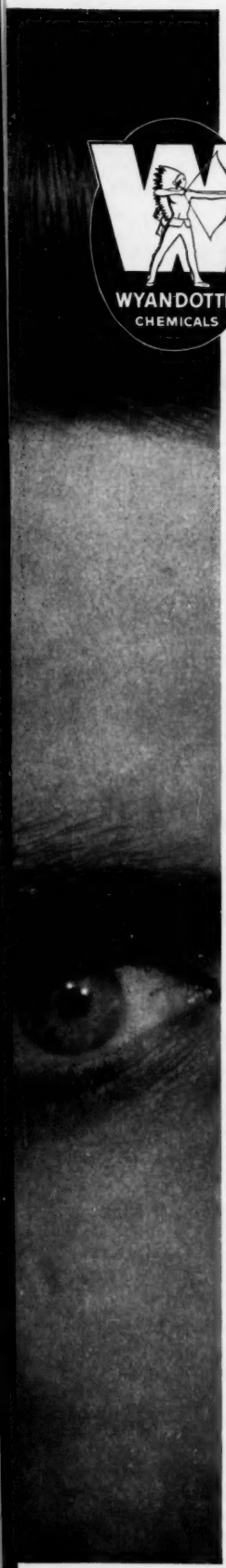




Should a chemical manufacturer take chemical distributors into his confidence?

Why not?

Distributors are not interested in experiments or top-secret government work.

Distributors want to know what products a manufacturer has that will be of help to his customers. What advantages, if any, the products possess. How to handle them. How to use them. How to store them. And how the manufacturer can help the distributor sell them to advantage. They want to know, too, what's new (at least a few days before the public announcement).

Simple, isn't it? Comes under the heading of good communications. Yet, some manufacturers treat such items as military secrets.

Because Wyandotte believes good communications are only good business, Wyandotte distributors receive data sheets, application information, reprints of advertisements, new-product announcements, and other sales aids as soon as they originate.

(The welcome mat is always out for Wyandotte distributors and their customers at our Research Center, too, when they need help on their problems.)

Thus, Wyandotte distributors are always well informed. They are well informed on Wyandotte's distributor policy, too, because it's clear-cut and written down. We would be happy to discuss it with you.

Wyandotte CHEMICALS

REG. U. S. PAT. OFF.

MICHIGAN ALKALI DIVISION

WYANDOTTE CHEMICALS CORPORATION, WYANDOTTE, MICHIGAN

Offices in Principal Cities

Where Canadian Tariff Rate Changes Will Pinch U.S. Chemical Producers

Principal U.S.-to-Canada chemical exports on which Canadian duty rates are expected to be increased.

Commodity	Export Value (thousand dollars)		Duty Paid (thousand dollars)		Average Duty as Percent of Export Value
	1955	1956 (1st 9 mos.)	1955	1956 (1st 9 mos.)	1955 and 1st 9 mos. of 1956
Caustic soda	$3,419	$3,374	$10	$10	0.3%
Soda ash	1,617	575	264	279	26.3%
Dyes and stains	3,934	2,188	duty free	duty free	——
Pigments	7,814	6,978	1,100	1,000	14.2%
Paints	1,685	1,243	253	186	14.9%
Fertilizers	10,998	8,286	550	414	5.0%
Insecticides	7,224	6,491	983	811	13.1%
Glycerine	1,509	1,072	302	214	20.0%

Coming: Stiffer Canadian Tariffs

Succumbing to industrial and economic pressures, Canada's Minister of Finance has ordered the first general overhaul in 50 years of his country's chemical tariff structure. Results are certain to cause U.S. producers to take a new look at the profitability of their exports to the north.

Tariff hikes—sure to be recommended by the tariff board that will investigate the present structure—will mean an end to almost-unrestricted exporting of many chemicals and allied products into Canada. For some U.S. concerns, hikes will mean reduced sales in Canada; others may lose their Canadian markets entirely as it becomes unprofitable to compete with lower-priced domestic products.

Pressures at Work: Finance Minister W. E. Harris' decision to have a good look at chemical tariffs, many feel, was due in part to pressures from industrial groups—including organized labor.

Just recently, members of the United Rubber Workers of America, in Kitchener, Ont., asked the Canadian government to stop unrestricted importation of foreign-made tires and footwear. As a result, tariff hearings were ordered.

About the same time, it was rumored that similar pressures were being exerted to restrict importation of chemicals and allied products—many of which came in duty-free, or at very low duties.

Chemical Imports Climb: Official reports place the value of chemical and allied products imported from all countries at $173.3 million for the first seven months of 1956—an increase of 21.6% over the corresponding 1955 period.

Reports further state that under existing tariffs, Canadian manufacturers could and did import some bulk chemicals at less cost than they could be bought from Canadian sources.

Any rise in tariff rates recommended by the tariff board will most certainly be motivated by a desire to protect Canadian chemical makers. Even without such government aid, Canada's chemical industry appears to

be booming, with still brighter days in prospect. This is the consensus of the recently tabled report of the Royal Commission (Gordon Commission) on Canada's economic outlook.

Capital Spending Doubles: Official figures list 1956 chemical production at $1,150 million—an increase of nearly 10% over '55. New chemical investments approached $140 million last year, which was double the previous year's figure. Petrochemical and heavy-chemical growth are given the lion's share of the credit for the increase.

But the Gordon report admits certain weaknesses in the economy, and cites as a major problem the lack of large pools of capital in Canada for long-term projects which involve risk, and on which no return may be expected for several years.

Such a lack of capital, the report says, has encouraged the influx of foreign capital investments—particularly from the U.S. The result, it is said, has been foreign domination of certain key industries—including segments of the chemical industry.

'Economic Nationalism': Pressures on government from labor and business were instrumental in shaping the Gordon Commission's suggestions that certain steps be taken to gain for Canada control of its key industries. For the time being, government suggestions call for only voluntary action, inasmuch as many U.S. companies are known to be re-examining relations with their Canadian subsidiaries.

U.S. producers have a major interest in most chemical commodities to be considered by the tariff board (*see table*). In eight product classifications, U.S. chemical makers do more than $38.2 million worth of business with Canada each year.

During the first nine months of 1956, duties amounting to $2.9 million were paid on imports of these products into the Dominion. In addition, another $130,477 duty was paid on products to be considered by the board, but not listed in the table—including butyl and methyl alcohol, disinfectants, finished coal-tar products, sulfuric and nitric acids.

Low Duty on Large Lots: An interesting aspect of Canada's chemical tariff structure is the rate differential between bulk and small-package shipments of certain products. On insecticides, for example, shippers must pay 12½% duty on units of less than three pounds. Bulk packages of three pounds and more enter duty free.

In addition to the commodities included in the table—each of which normally has an annual export value of more than $1 million—the tariff board will check into basic industrial chemicals in general, industrial alcohols, fungicides, explosives, and all chemicals used in making soap, detergents and rubber. Also included will be a number of chemicals used in the plastics industry.

Excluded from the review will be petroleum products, adhesives, toilet preparations and pharmaceuticals.

Won't Overlook GATT: "If the board should indicate that amendments to the Customs Tariff are desirable," Harris says, "I would suggest that the board prepare a revised schedule of tariff items relating to chemicals, with recommendations as to rates of customs duty, and include the proposed schedule in its report."

The finance minister cautioned that the board should keep in mind the obligations of the General Agreement on Tariffs and Trade. He pointed out that certain adjustments in margins of preference may be involved. No general change in preferential margins is contemplated at this time, he said.

The rapid growth of Canada's plastics industry since a general tariff revision approved by Parliament in 1952 is a sterling example of protection at work, and one not to be overlooked by the tariff board.

Plastics Production Jumps: The factory value of shipments of primary plastics rose in 1955 to an all-time high of $75 million—27% higher than in the previous year. Production of synthetic resins jumped 13.3% during the same period.

Apparently satisfied with the growth of this industry, Harris has suggested that plastics not be included in the upcoming general review.

Tariff board hearings will most likely get under way this fall, and Board Chairman Hector MacKinnon figures the hearings will last through most of 1958.

Only with publication of the revised schedule will U.S. producers know exactly where they stand, but one fact can be considered even now for future planning: with emphasis on more domestic control of Canadian industry and increased tariff rates on chemicals, exports into that country will be in for stiffer competition.

MASON: He warns of trade law's 'idiosyncrasies.'

Trouble Ahead in Organics

Synthetic organic chemical manufacturers had best get set for increased activity under Robinson-Patman Act.

This is the advice passed along to the Synthetic Organic Chemical Manufacturers Assn. recently by Lowell Mason, retired Federal Trade Commissioner.

Warning SOCMA members that they will have to pay more attention to the "idiosyncrasies" of the act, Mason said the impact of the law will hit the organic more than the inorganic side of the chemical industry.

The danger comes, Mason told synthetic organic chemical manufacturers, when you "start upgrading your products." This he sees as a current trend in this industry.

When this happens, Mason cautioned salesmen, directors of marketing and vice-presidents in charge of sales, you "had better let your general counsel or your house attorney call in the experts."

"As you upgrade your products," the former commissioner said, "so that they themselves eventually land on the retailer's shelf, they are more apt to flow through divergent channels whose economic interests clash."

"Try as you may to equate the savings in cost, the advantages of production above the break-even point, the value of prestige promotion, or any other real or fanciful gain you may think is yours," Mason said, "you are

in for trouble if you are going to compensate for these things over and above what you give everybody else." "To those who believe in the right to pay for what they get," he added, "this is an anathema."

LEGAL

Dip-type Cleaner: In a decision that recognized the right of a company to engage in the continued manufacture of a product after a similar product has been patented by another company, a federal district court in Ohio has awarded damages of $100,000 plus $15,000 attorney's fees to Fahrbach Chemical Co. (Cincinnati) against International Industries and Developments (New York).

Fahrbach began manufacturing a dip-type liquid silver cleaner in 1952, and in February, 1953, International received a patent under which it manufactured a similar product.

Within 60 days of the patent issue, the record held, International mailed 8,000 letters to the "trade" on the letterhead of a patent attorney and bearing the attorney's signature. The letter said that any persons manufacturing, advertising, selling or distributing dip-type silver cleaner, other than those licensed under International's patent, were guilty of infringement and "liable to prosecution."

The court said International had been "engaged in willful, wanton and premeditated acts of unfair trade practice and unfair competition, to Fahrbach's irreparable damage."

•

Bag-Filling Machine: After two years of litigation, Judge Joseph Lieb of the U.S. district court for the Southern District of Florida, Miami Division, has ruled invalid and not infringed a bag-filling machine patent belonging to Inglett & Corley. Defendant in the action was Everglades Fertilizer Co.

Inglett & Corley entered suit for infringement shortly after Everglades, in November, 1954, purchased a "Kraftpacker" brand open-mouth bag-filling machine from Kraft Bag Corp. Inglett & Corley manufacture the "I & C Bagger," sold by Union Bag-Camp Paper Corp.

The court granted a motion of summary judgment to the defendant, and the patent was declared invalid by virtue of prior public use.

Laws' Leverage on Fertilizer Wages

(Percentage distribution of fertilizer production workers by average straight-time hourly earnings. Source: U.S. Bureau of Labor Statistics)

Hourly earnings (in cents)	March-April 1949	April-May 1950	April 1956
Less than 75	23.8%	4.9%	0.7%
75 to 99.9	37.2%	53.6%	2.4%
100 to 124.9	26.5%	24.8%	43.0%
125 to 149.9	9.9%	12.8%	21.7%
150 and more	2.6%	3.9%	32.2%
	100%	100%	100%

Pay Law's Southern Accent

The big labor unions have decided to soft-pedal their demand for a $1.25 wage floor and to concentrate instead on extending coverage of the Fair Labor Standards Act. It means that the wage-sensitive fertilizer industry can count on at least another year before there'll be any major boost in the U. S. minimum wage.

Because of its extensive use of manual labor for mixing, bagging and materials handling, fertilizer manufacture was expected to feel repercussions, particularly in the South, of the $1/hour minimum wage rate that took effect last March.

But indications of new studies by the Bureau of Labor Statistics are that, over-all, the industry's rise in wage rates in 1956 was little more than the increase in '55; and more closely keyed to the generally rising, all-industry wage trend than to the new federal minimum wage boost.

Up by Stages: There's no doubt that the 1950 and 1956 increases in the U. S. minimum wage—to 75¢ and $1/hour, respectively—helped to herd many fertilizer workers into higher pay brackets (*see table*).

On the other hand, the climb in the industry's average gross hourly earnings last year is roughly in line with the 10-year trend toward higher pay scales throughout the country. From a $1.55 average for the six months preceding the effective date for the $1 minimum, fertilizer earnings mounted by 5¢/hour to a $1.60 average for the next six months.

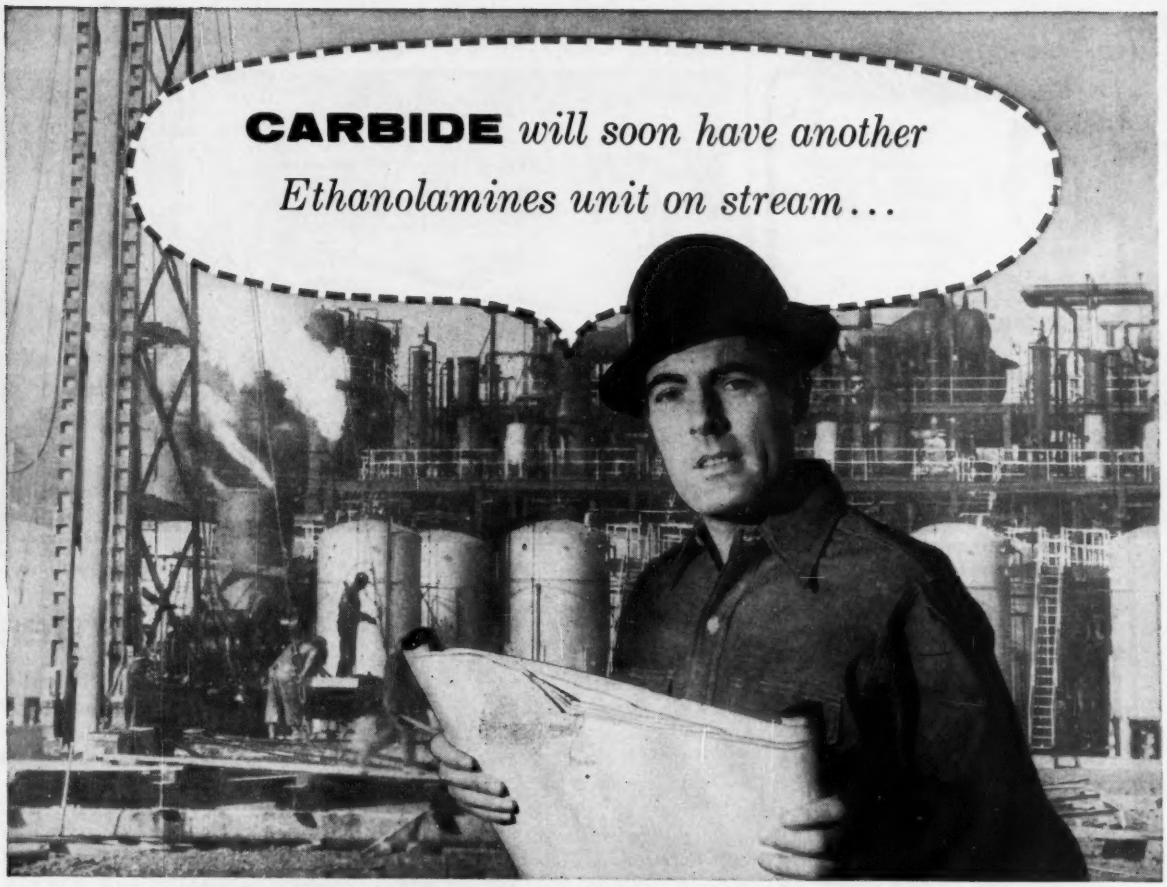
By comparison, the increase for the corresponding periods one year earlier was 4¢—from $1.46 to $1.50/hour. In the "chemicals and allied products" industries as a whole, there was a 6¢ increase each year.

Big Shifts in South: BLS figures indicate that in Southeastern fertilizer plants, about one-third of the production workers were directly affected by the two minimum wage increases.

Average straight-time hourly earnings in Southeastern fertilizer plants moved up from 74¢ in 1949 to 80¢ in '50 and $1.12 in April '56 for a 38¢ gain. For the fertilizer industry as a whole, the figures were 92¢ in '49, 97¢ in '50 and $1.34 last April—a 42¢ rise.

This latest BLS survey—which might be found suitable for use as a basis for new determinations under the Walsh-Healy government contracts law—seems to show that the 1956 minimum wage boost had only local and relatively minor effects on chemical process operations in general.

For some small and medium-sized fertilizer makers in the South, however, the pain lingers.



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You can share in this increased availability by checking with your CARBIDE Technical Representative now.

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- You don't have to worry about continuous supply—especially with CARBIDE's plants drawing on a constant source of raw materials.

Write today for your copy of the booklet "Nitrogen Compounds," which discusses applications, physical properties, and specifications for CARBIDE's ethanolamines. Address—Carbide and Carbon Chemicals Company, Room 308, Dept. H, 30 East 42nd Street, New York 17, New York.

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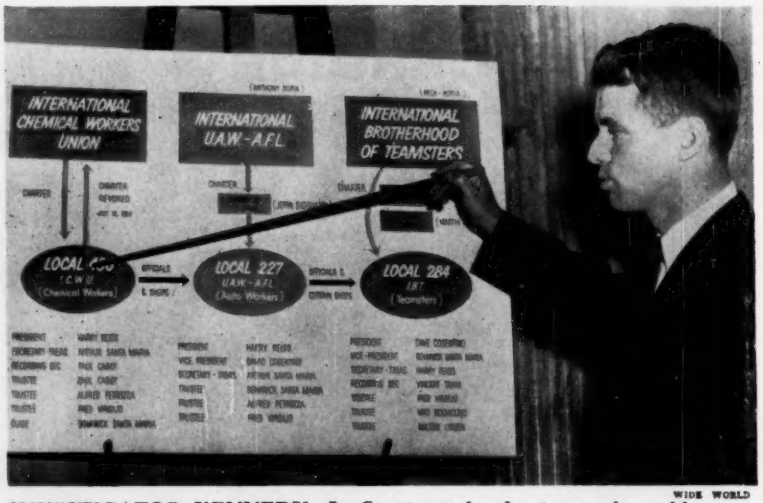
J. P. Coleman
GOVERNOR OF MISSISSIPPI

Mississippi Agricultural & Industrial Board
STATE OFFICE BUILDING
JACKSON, MISSISSIPPI

THE BAWI STATE



WIDE WORLD

INVESTIGATOR KENNEDY: In Senate probe, he tags union with . . .

New 'Racketeering' Charges

For the second time within the past four months, racketeering within the International Chemical Workers Union (AFL-CIO) has been alleged.

Latest instance came at the start of last week's hearing in Washington by the Senate Permanent Subcommittee on Investigations, which has been looking into charges of corruption on the part of various labor union officials. Chief Counsel Robert Kennedy was trying to show that there had been illegal actions on the part of several persons who had organized an ICWU local in New York—subsequently they took the local into the AFL's United Auto Workers (now the Allied Industrial Workers) and then into the International Brotherhood of Teamsters, also of the AFL.

No Chemical Connections: Kennedy's report noted that the local union in question—ICWU local 496—was ousted by ICWU's executive board in 1953 because its officers were "involved in extortion." Checking by *CW* indicates that no chemical company had any dealings with that local, which had been chartered in May, 1952. The only labor contract that local is known to have negotiated was with a New York hardware firm.

An ICWU officer told *CW* that local 496's charter was cancelled for "lack of cooperation" and "because we felt they were the kind of people we didn't want in the union." He added that the local didn't appeal its ouster. Kennedy sought to establish that two of the local's officers—Dominick Santa Maria and Harry Reiss—had filed false financial reports and had fraudulently drawn on union funds while the local was affiliated with the former UAW-AFL.

Cited in Convention: A special committee of ICWU members and officers is assigned to look into corruption charges that were aired at the union's 13th annual convention, which was held last October in Buffalo. A delegate from local 61 (Rensselaer, N.Y.) read a letter from two ICWU vice-presidents stating that local memberships would be given "all factual evidence regarding these individuals in Region 3 (New York and New Jersey area) who have been receiving kickbacks from employers, insurance companies, and labor racketeers regarding union pensions and welfare funds."

Several other delegates—including Noel Hunley of Florida, who the next day was elected ninth vice-president of ICWU for this year—demanded prompt investigation of those allegations.

So far, no evidence has been given—publicly, at least—to support these charges. The union's special committee is scheduled to make its report to the ICWU executive board before the 1957 convention, and that report—if it turns out to be too hot for the executive board to handle—could be forwarded to the AFL-CIO's committee on unethical practices.

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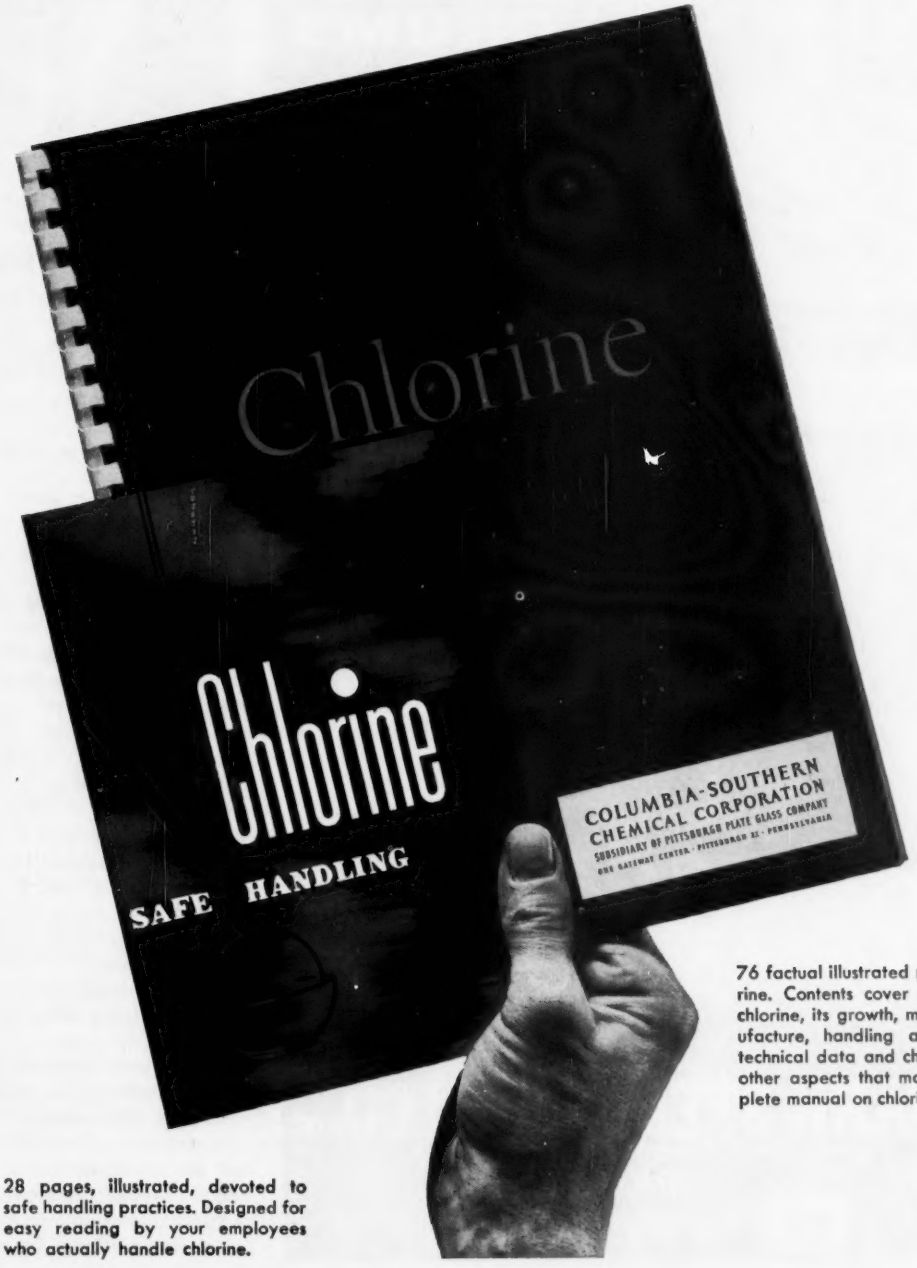

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WIDE WORLD

GOVERNOR KNIGHT: Wanted—a labor standards law for California.

Strong for Wage Plan

Trend in the Works? In the wake of last year's increase in the federal minimum wage rate to the present $1/hour level (*see p. 34*), a number of state office-holders are moving to put similar floors under wage rates in intrastate business. This would directly affect only a very few chemical process concerns, which are preponderantly engaged in interstate commerce; but it would tend to jack up prevailing wage levels in many communities with chemical plants.

One leader in this move is California's Gov. Goodwin Knight, who's calling on his legislature to enact "an up-to-date fair labor standards act" patterned after the federal law. Knight didn't specify what the minimum wage should be, but one of the lawmakers promptly offered a bill that would set the minimum at $1.25/hour. In Maryland, organized labor is plugging for a $1 minimum for workers not covered by the federal law; Michigan's upper house has before it a bill for a $1.25 minimum; and Arkansas' state labor commissioner is advocating a 70¢/hour lower limit.

•

More Liberal Pensions: Union Carbide and Carbon Corp. is planning to offer soon some major new benefits in its employee pension plan, provided that the stockholders and the U. S. Internal Revenue Service approve. One of the changes would increase monthly retirement benefits by as much as

$42.50; and if the new plan is approved, these more liberal payments will begin in May for persons already on the retired list. A new "vested right" provision would allow a 10-years'-service employee who leaves the company after age 40 to receive pension benefits at age 65.

•

Profit-Sharing Anniversary: Procter & Gamble's profit-sharing plan is 70 years old, and the company is observing the anniversary with a series of "dividend day" meetings for employees and their families. Latest profit-sharing totals: $10 million during the past year to some 14,000 employees, and a $94-million total since the plan was introduced in 1887.

KEY CHANGES

Bruce M. Bare, to marketing manager, Chemicals Division, Atlas Powder Co.

William J. Urbowicz, to product manager of alicyclic chemicals, National Aniline Division, Allied Chemical & Dye Corp.

Emil C. Gerdes, to manager of commercial products, Diamond Black Leaf Co. (Cleveland).

Allan Sproul, to director, Kaiser Aluminum & Chemical Corp.

Francis M. Parker, to director of marketing, American Viscose Corp. (Philadelphia).

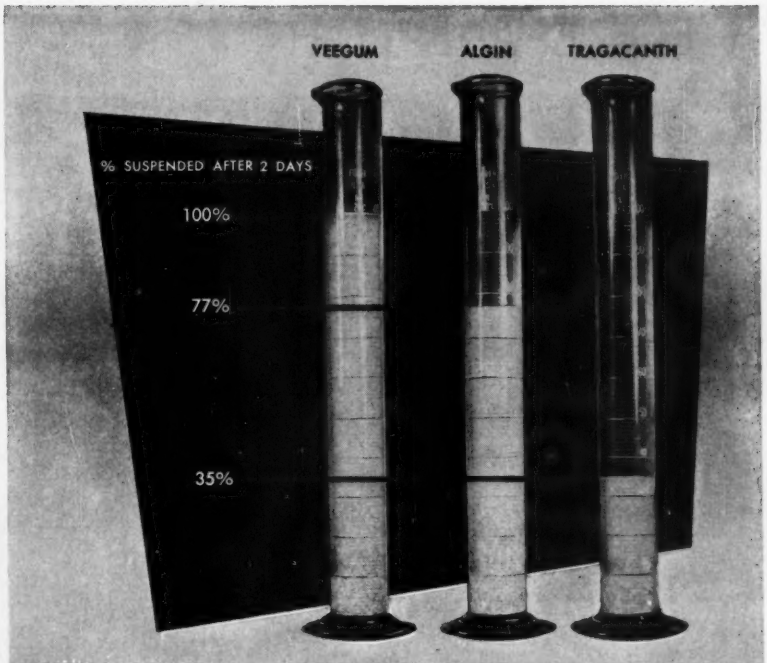
Albert Chervenak, to manager, Veterinary Dept., E. R. Squibb & Sons, division of Olin Mathieson Chemical Corp.

Richard B. DeMallie, to general manager, international division, Eastman Kodak Co. (Rochester, N.Y.).

Frank Seeland, to vice-president, S. B. Penick & Co. (New York).

William H. Perks, to treasurer, Norton Co. (Worcester, Mass.).

J. W. McLaughlin, to manager, Film and Sheeting Division, Bakelite Co.; **L. W. Newton,** to assistant to the vice-president, research, Carbide and Carbon Chemicals Co.; **Adolph Q. Lundquist,** to vice-president, Union Carbide Nuclear Co.; and **Headlee Lamprey,** to manager of chemical research, Metals Research Laboratories, Electro Metallurgical Co.; all divisions of Union Carbide and Carbon Corp.



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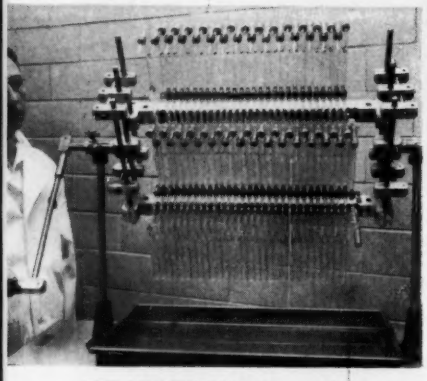
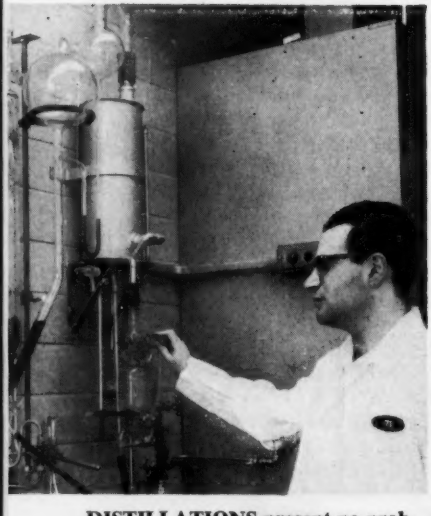
TABLETING is one of many drug lab chores.



SEPARATIONS of complex compounds are routine work.



DISTILLATIONS present no problems for nonprofessionals.

SOIL SCREENING in antibiotic lab is relatively new task for technicians.

Semipros Take On

This week, the once-unsung laboratory technician is finding himself atop a crest of popularity, and the object of unaccustomed interest in his care and propagation.

In a recent report to the National Committee for the Development of Scientists and Engineers, Maynard Boring—General Electric's director of engineering recruitment and head of the committee's task force on technician utilization—puts heavy stress on the need for recruiting and training greater numbers of "scientific and engineering technicians."

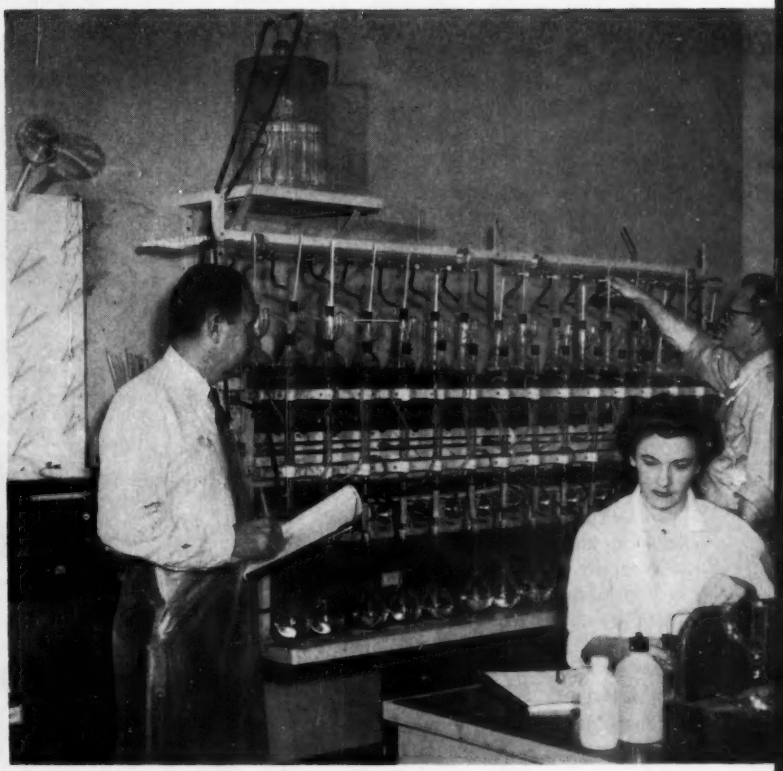
By Boring's definition, the latter are men and women schooled in the fundamentals of science who fill jobs at a level somewhere between that of the professional scientist or engineer and the industrial craftsman.

Difference of Opinion: Ask research directors if they need more nonprofessionals on their staffs and the answers range from a flat "no" to "as many as we can get."

Some companies have definite policy on this score, try for a fixed ratio of technicians to professional researchers. At Dearborn Chemical Co., for example, the goal is two technicians to one Ph.D. At General Motors sprawling technical center the ratio of nonprofessional to professional researchers is 5 to 1.

Other firms take a more informal approach to their technician needs.

But before expanding their nonprofessional staff, most companies will take a close look at the impact such help has already had on their research. Some observations are discouraging—e.g., "Once a professional researcher gets a slave he sits on his hands." On the other hand, some researchers find it hard to accept the idea that they can be replaced, even if only in part, by nonprofessionals. They



ANALYTICAL WORK is traditional assignment.

New Laboratory Tasks

resist giving technicians enough responsibility.

But most companies find that the advantages of maintaining technicians on their research staffs outweigh the drawbacks. A *CW* survey finds technicians in the laboratories of firms representing every branch of the chemical process industries.

Sampling: Pennsalt, Sharp & Dohme, Atlantic Refining, Stauffer, California Research, Shell Development Co., Carbide and Carbon Chemicals, Abbott Laboratories, Toni Co., Dearborn Chemical, Velsicol Chemical.

There's little uniformity in the nature of the work technicians do for these companies, what they're paid, or how much schooling they've had.

In drug firms, technicians operate tablet-compressing machines, carry out Kjeldahl digestions (for nitrogen determination), operate spectrophotometers, help screen soils for new antibiotics. Petroleum companies use technicians to carry out both routine and complex analytical tests, operate experimental equipment (varying from laboratory equipment to large-scale pilot plants) prepare, blend, compound, and test experimental products. One petroleum concern uses them as test-car drivers. At a big chemical company, technicians man the emission spectrometer, run electronic data computing machines. Professional supervision, in varying degrees, is provided in all of these cases.

What They're Paid: Depending on individual skills, these nonprofessional researchers may make as little as $31.-90/wk. or as much as $150. Houdry Process Corp. pays $4-8,000/year for such staffers at its research and development laboratories in Linwood, Pa. Dearborn Chemical in Chicago pays $3,600-4,800/year, depending on experience, may also help finance the technician's further education.

In the San Francisco Bay area, the scale for laboratory technicians is somewhat higher, starts at about $375/month, goes as high as $575 in most chemical manufacturing companies.

Some West Coast nonprofessional researchers are members of the Independent Union of Petroleum Workers. The union contract specifies three categories for such personnel: laboratory assistant, research assistant and senior research assistant (with 2 or 3 grades in each category). The lowest starting salary for the laboratory assistant is $362/month; a senior research assistant can earn up to $500/month.

But unionization of technicians is a matter causing only limited concern among companies surveyed. One reason: the technicians identify themselves closely with professional re-

searchers—who tend to treat them as equals. This applies particularly to small, decentralized research laboratories.

Premium on Education: As a rule, minimum educational requirement for a technician's job is a high-school diploma. But at National Drug Co. (Philadelphia) nothing lower than a B.S. will do. National Drug's prime researchers are mostly Ph.D.'s who guide M.S.'s and B.S.'s in projects that involve considerable responsibility on the part of the technicians.

Houdry will accept high-school graduates (in noncommercial courses), encourages them to further their education. Of Houdry's research staff (not counting administrative and mechanical employees), 38% own college degrees.

In Demand: The supply of qualified research and engineering technicians is generally tight. But exceptions are to be found. One California research organization finds it can fill its needs for physical science laboratory technicians in less than two weeks; electronics technicians take longer to find.

Chemical aides aren't the hardest to find, either. A petroleum research company reports: "We need machinists worse than we need chemical research assistants."

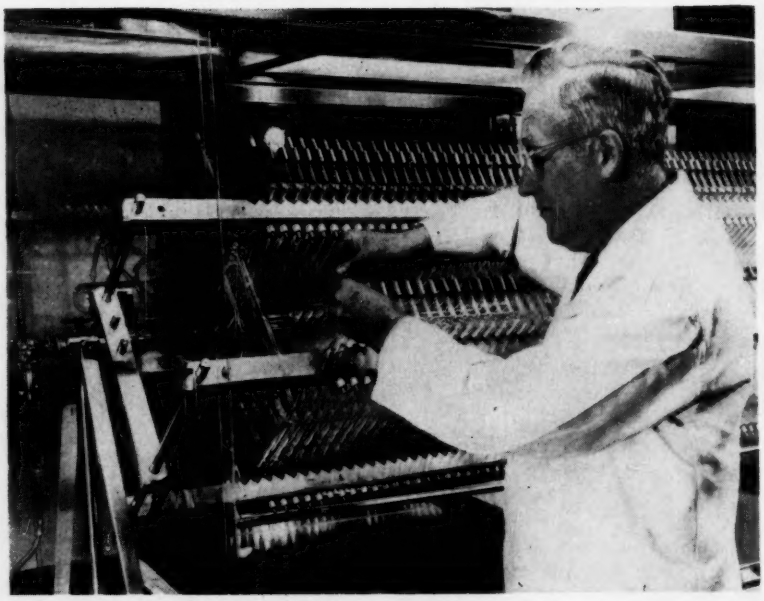
Boring concedes that the nation's educational system isn't yet geared to develop such personnel in appreciable numbers. He looks to industry to upgrade its skilled workers to technician status.

But that doesn't mean schools haven't started turning out some technicians. One source is junior colleges, whose two-year curricula are often ample to fit graduates for specialized, nonprofessional research posts.

The committee is now preparing a booklet to tell management how to train and use scientific and engineering technicians. Other instructional materials will boost the idea of technician careers for high school students.

The committee is also seeking to get government and educational organizations to give increased recognition to technician-training institutes, give their graduates higher status.

Research management in the chemical process industries obviously does not have to be sold on technicians. But it also knows that an army of technicians will not substitute for one creative researcher.



USDA'S DUTTON: In unraveled glycerides. . .

Keys to Glycerine's Future

A trio of researchers—each in a different field—shared $1,500 in awards bestowed last week by Glycerine Producers Association.

Their accomplishments: application of a separation technique that sheds light on how glycerides are synthesized in nature; utilization of glycerine to form stable high-caloric fat emulsions for intravenous injection; and establishment of glycerine derivative, triacetin, as a new fungicide. Although theoretical in motive, the work of all three has practical applications.

Top award, $1,000 and an honor plaque, went to Herbert Dutton, research chemist at the U. S. Dept. of Agriculture's Northern Utilization Research Branch* (Peoria, Ill.). Dutton used a Craig countercurrent distribution apparatus (*above*) to determine the composition and structure of complex natural glycerides.

The method, a refinement of the centuries-old technique based on differential solubilities of solutes in two immiscible solvents, was used to separate trilinolenin, linoleo-dilinolenin, oleo-dilinolenin, and other triglycerides from linseed oil. It's the first time trilinolenin and lineo-dilinolenin have been isolated from a natural oil.

*And head of its Forage and Agricultural Residues Section.

Dutton also established the manner in which fatty-acid radicals are arranged on the glycerine molecule in the complex triglycerides, found the arrangement is "random" rather than an "even" pattern as previously supposed.

To producers and users of oils, fatty acids and mono, di- or triglycerides, Dutton's research has commercial implications. It will make possible the production of more "tailormade" glycerides and fatty esters, could lead to development of new products based on the glycerine components of various oil and fat fractions.

Donald Zilversmit, University of Tennessee Medical Units (Memphis) physiology professor, won second prize ($300 and an honor plaque) for preparing stable fat emulsions that can be taken intravenously by patients unable to take oral nourishment. He uses alcohol-soluble soybean phosphatide as an emulsifier, suspended in glycerine by vigorous agitation.

Coconut oil is added with stirring until a homogenous mixture is obtained. Unlike older aqueous emulsions, the anhydrous mixture can be stored, used when needed to make fat emulsions of 10-20% fat by diluting with water containing 5% glucose.

Third prize, $200 and an honor

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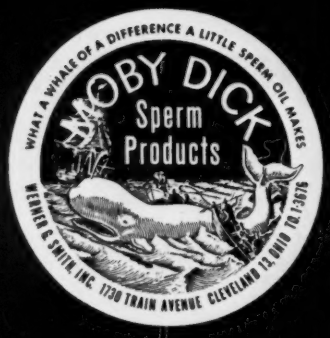
City.....Zone....State.....

Your Name.....


WHAT A WHALE OF A DIFFERENCE A LITTLE SPERM OIL MAKES
MOBY DICK
Sperm
Products
WERNER G. SMITH, INC. 1730 TRAIN AVENUE CLEVELAND 13, OHIO TO 1-3676

MOBY DICK®

45 NW

SPERM OIL

Cloud	44 - 46°F
Pour	39 - 42°F
Iodine	80 - 90
Unsap. %	30 - 40
Saponification	132 - 140
FFA	2% max.

YEAR-ROUND AVAILABILITY

Cleveland Refinery | New York Storage

TWO SOURCES

Hydrogenated Sperm Oil

•

Blown Sperm Oil

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plaque, went to Stanley Knight, associate professor of bacteriology, University of Wisconsin (Madison). Knight determined that triacetin (glycerine triacetate) would inhibit the growth of skin fungi, opened the door to new chemotherapeutic agents based on the compound.

PRODUCTS

Shrinkproofer: Schwarz Laboratories (Mount Vernon, N.Y.) is now offering N-acetyl-DL-homocysteine thiolactone, a compound that reportedly is useful for shrinkproofing wool. It works two ways: modifying the elastic property of wool by forming new peptides; providing greater rigidity by producing new cross linkages in the form of disulfide bonds after reduction of the wool.

•

Vulcanizing Agent: A new vulcanizing agent that's said to permit the controlled curing of elastomers and resins (cross-linkable with organic polyamines) is newly available from M. W. Kellogg (Jersey City, N.J.). Designated HMDA-Carbamate, it's an inner salt of ω-aminohexylcarbamic acid; it is also said to show promise as a curing agent for rubbers of the reactive halogen or acrylic ester type.

APPARATUS

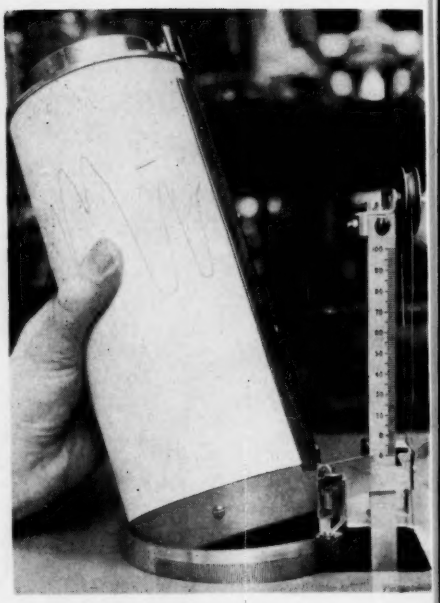
Atom Smasher: High Voltage Engineering Corp. (Burlington, Mass.) will build a new 10-million-volt Van de Graaff particle accelerator that's said to be the most powerful machine of its type obtainable. Called the Tandem Accelerator, it will be equipped with a switching magnet to shift the particle beam into any one of four directions.

•

Mixing Master: A new stirring device that's held to be superior to conventional stirrers is available from Brinkmann Instruments (Great Neck, N. Y.). A circulatory movement combined with a beating motion allegedly prevents the formation of small clumps during mixing, a problem encountered with present mixers. The device is called Vibro-Mixer.

•

Isolation Lab: Fisher Scientific Co. (Pittsburgh, Pa.) is offering a versatile laboratory isolation unit for studies in radiochemistry, biology, toxic chemicals, etc.



DEMOUNTABLE DRUM: Advanced design for a low-cost model.

New Boost for Infrared

There are now about 2,000 infrared spectrophotometers in the world. In five years, their number will triple, in the opinion of Van Zandt Williams, general manager of Perkin-Elmer's (Norwalk, Conn.) instrument division. P-E's bid for a bigger piece of the infrared market was bolstered this week with the introduction of a low-cost (less than $5,000) instrument.

Like its more expensive competition, the newcomer * identifies chemical compounds by their characteristic infrared absorption, whips through analyses in minutes. But, for certain assignments, it's no substitute for the more complex machine.

Less than one-third the cost of present, more elaborate machines, the bargain-basement model is P-E's bid to put infrared analysis within the reach of most organic chemistry laboratories. Advanced feature of the instrument is the drum (*above*), which easily demounts to permit quick insertion of recording paper.

P-E retained industrial designers Eliot Noyes and Associates to style the product, sells it in three colors—gray, tan and green.

*Named the Model 137 Infracord spectrophotometer.

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some product of
Allied Chemical
serves nearly every
home
farm
and factory
in America

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GENETRON refrigerants for air conditioners and refrigerators
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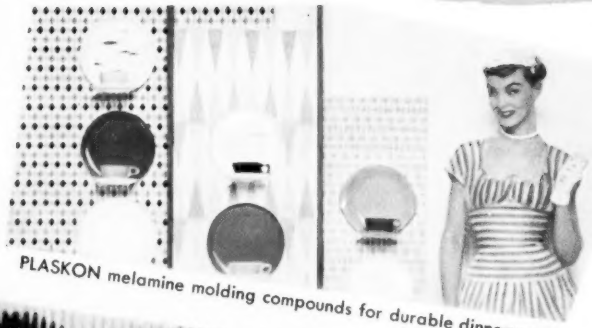
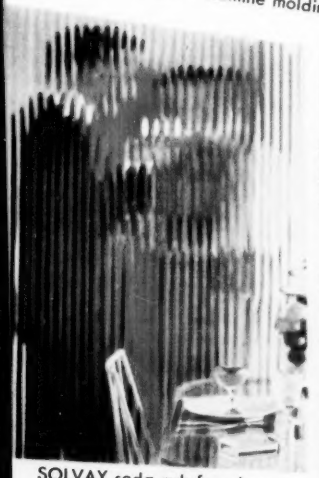
to serve you better at HOME

This is the house that Allied Chemical built. Smartly furnished. Comfortable to live in. Easily maintained. Built with products that rely on Allied chemistry. Home is where Allied is. On the farm and in the factory, too.



PLASKON melamine molding compounds for durable dinnerware
(Barrett Division)



SOLVAY soda ash for glass
(Solvay Process Division)

NACCONATE isocyanates for urethane foam cushions
(National Aniline Division)

A-C polyethylene for plastic housewares
(Semet-Solvay Division)

A-C, GENETRON, MUTUAL, NACCONATE, N-DURE PLASKON, SNOW-WHITE and SOLVAY are trademarks of Allied Chemical

Allied Chemical

61 BROADWAY, NEW YORK 6, N. Y.

Allied to serve you better

at home

Our symbolic house on the previous pages shows but a few of the many products Allied divisions contribute to better homes. We might have also included CAPROLAN deep-dye nylon for carpets and upholstery, ALLITE translucent panels, BARRETT insulation board, A-C polyethylene for waxes and polishes, SOLVAY paradichlorobenzene crystals to prevent moth damage, ORCHARD BRAND insecticides, MUTUAL chrome tanning agents for leather upholstery, NITROGEN urea for plastic television cabinets, and NATIONAL dyes and pigments for color throughout the home.

DIVISIONS		PRINCIPAL PRODUCTS
BARRETT, first in roofing for over a century, now offers a full line of building materials. Barrett's trademark covers a host of chemical products, as well as the growing line of PLASKON resins and plastics.	Barrett	Coal-tar chemicals, resins, plastics and plasticizers, roofing, insulating board and other building products, bituminous road materials, pipeline enamels, wood preservatives, industrial pitches.
GENERAL CHEMICAL, famous as a dependable source of supply for heavy chemicals and BAKER & ADAMSON laboratory reagents, produces GENETRON refrigerants used in refrigerators and air conditioners, and as propellants for aerosol sprays.	GC	Sulfuric and other commercial acids, alums, phosphates, sodium compounds, fluorine compounds, reagent and laboratory chemicals, insecticides and fungicides.
MUTUAL CHEMICAL, the principal American producer of chromium chemicals for pigments and chrome plating, and KOREON for leather tanning, is constantly broadening the fields of application for these versatile products.	MUTUAL	Sodium bichromate, sodium chromate, potassium bichromate, chromic acid, ammonium bichromate, sodium sulfate and other chromium chemicals.
NATIONAL ANILINE, long a leader in dyes, certified food colors and intermediates, is now also producing CAPROLAN — the new concept in nylon — and NACCONATE isocyanates for urethane foams.	NATIONAL ANILINE	Dyes and certified food colors, industrial organic chemicals including isocyanates and caprolactam, synthetic detergents, pharmaceuticals, nylon fibers.
NITROGEN, the world's foremost producer of fixed nitrogen in its many forms, offers a wide line of ARCADIAN fertilizers. Its industrial line includes ammonia, ethylene oxide, ethylene glycols and ethanolamines.	NITROGEN DIVISION ALLIED CHEMICAL	Anhydrous ammonia, nitrogen solutions, urea fertilizer materials, methanol, formaldehyde, ethylene oxide and derivatives.
SEMET-SOLVAY, first in merchant coke production, also builds WILPUTTE by-product coke ovens. It supplies A-C polyethylenes for use in food cartons and paper, in printing inks, waxes and polishes.	SEMET-SOLVAY COKE	Coke and by-products, coal, gas producing apparatus, Wilputte coke ovens, and polyethylenes.
SOLVAY PROCESS, long-established leader in alkali production, has found new markets with chloromethanes, hydrogen peroxide, vinyl chloride monomer and aluminum chloride.	SOLVAY	Soda ash and other commercial alkalis, chlorine, calcium chloride, ammonium and potassium compounds, chloromethanes, hydrogen peroxide, cleaning compounds, chlorobenzenes, ammonium chloride and vinyl chloride monomer.
INTERNATIONAL is the newly organized overseas marketing arm of Allied's seven operating divisions. It sells and services products made by these divisions for customers throughout the world.	Allied Chemical International	

RESEARCH — Allied's Central Research Laboratory at Morristown, New Jersey, carries on activities that benefit all divisions. In addition, each division conducts its own research at laboratories devoted to its particular field of interest. In 13 different laboratories, Allied Chemical employs more than 1600 people. These laboratories and technically-trained people are allied to serve you better.

Allied Chemical

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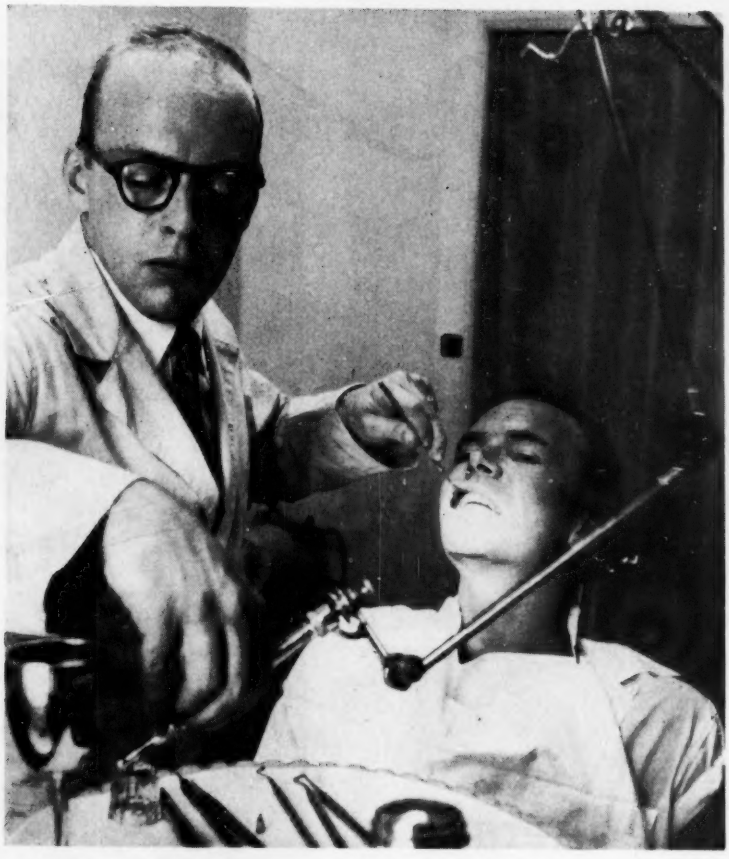
Target



Plastic Coating for Teeth

The young man in the chair is one of the 40 million Americans receiving adequate dental care, and he's paying his share of the U. S. public's $1½-billion annual dental bill.

The potential market for a specialty product that will reduce this staggering bill runs into millions of dollars. That's been the incentive behind the development of chemically fortified toothpastes, water fluoridation and fluoride products for application to the teeth. It is also responsible for another approach to the problem of dental cavities: a protective plastic coating for teeth.

What's being sought is a material that fills the teeth's "fissures"—folds in the crown or chewing surface formed while the tooth is developing. All molars, and some incisors, have these fissures, which are generally too narrow to be cleaned by toothbrushes, but provide ideal hiding places for decay-causing bacteria.

Finding a suitable tooth coating isn't simple. An ideal coating should be resistant to acid, bacteria, moisture, abrasion. It should be strongly adhesive, nontoxic, and nondiscoloring. And it should penetrate into the fissure, not merely bridge it.

Possibilities: Acrylics, already used to some extent as filling materials, won't qualify for several reasons. Their coefficients of expansion, much higher than that of teeth, give them poor adherence; they have little ability to inhibit bacteria; they retain mouth odors.

More promising are epoxy coatings. It's along this line that Dr. Michael G. Buonocore of the Eastman Dental Dispensary is currently working. Buonocore is in the third year of a research program sponsored by the Army, and he now envisions a two-component plastic-coating system (coating and catalyst) that would be painted on by a dentist.

The coating, 1/10,000 of an inch thick, would be applied every six months to the fissured area (not the whole crown) of the tooth.

Buonocore hasn't come up with the right product yet. But he's confident he's on the right track with an epoxy resin applied to a tooth that has been cleaned with chloroform or alcohol. His major problem now is adherence.

Ideally, the coating should be baked at 300 F onto the tooth—an obvious impossibility*.

Other dental researchers have reservations about the tooth-jacketing idea, although most feel it has some merit. Among the objections:

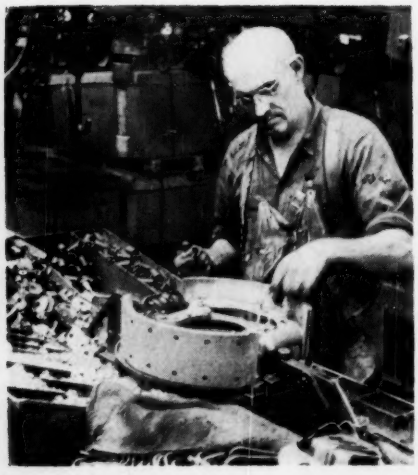
- Drilling and filling with silver amalgum is a simpler practice (Buonocore counters that this is just what he's trying to avoid).
- There is some danger in depriving the tooth of its natural environment (that's a possibility, Buonocore agrees, but not necessarily a bad one).
- Cleaning with chloroform might dehydrate tooth, permit coating to penetrate the tooth surface, damage the nerve.

There are obviously a lot of problems to be solved before a suitable coating is developed, but some imaginative probing could give results that would pay rich dividends to the company developing it.

There's this too: with a present ratio of 2,000 citizens for every dentist, and only 3,000 new dentists being graduated yearly from the nation's 42 dental schools, a cheap, safe and effective cavity preventive would be as much a blessing to beleaguered dentists as to their patients.

*Toxicity, which might seem to be a problem because of the amine hardeners used with the resin, doesn't arise, according to Buonocore. He says the hardeners are used in such small concentrations that there is no danger.

Then Truckers, motorists were once prime consumers.



Now Factory sales are biggest . . .

Printers are good customers, too.

Future Office sales are target.

Changing Market for Waterless Cleaners

Makers of waterless handcleaners this week have the first intensive outside evaluation of their products.* The U. S. Public Health Service, under an Air Force contract, has tested and ranked 15 of the cleaners from the standpoint of cleaning ability and skin irritation.

Government interest reflects the new markets the waterless cleaners are capturing. Motorists formerly accounted for most sales, used the materials for cleaning up after road repairs. Now the bulk of these products (over 90% on a poundage basis) goes to requisition purchasers, mainly in industry.

A switch in the principal market, however, has not altered the manufacturing picture. There are about 500 firms making waterless hand cleaners, of which 50 or 60 are comparatively well known. Nobody dominates the business, in fact nobody has as much as 5% of it. The small over-all volume has kept big companies from developing much interest; freight costs have kept it regional; and the ease of manufacturing the cleaners has brought in many low-capital producers.

Waterless Who's Who: It's hard to gage the size of this sprawling market. Most think it's small—although it has a substantal potential. One estimate puts the total market now at $5-6 million, with about $1 million (wholesale) going into retail (a reflection of consumer prices that are more than double industrial). Another is that most makers of good waterless cleaners gross between $300,000 and $600,000 a year. A third estimate is that the waterless products now have about 10% of the industrial skin-cleanser market.

Not dominant, but bigger than

*The report is available at $1.75/copy from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C. It's PB 121389, Evaluation of Waterless Hand Cleaners, by D. J. Birmingham and V. B. Perone, U.S. Public Health Service for Wright Air Development Center.

Keeping the business end of a hull in business!

Every craft, from a roaring speedboat to the lazy family canoe, is only as seaworthy as the thin "skin" of finish that shields it. And this vital "skin" has to be tough to provide active protection from water, wind, weather!

Superior resins produced through the use of Olefins are greatly responsible for modern rugged finishes. Olefins are members of Atlantic's petrochemical family; that's why you see the oil refinery in the picture.

Olefins are used in production of quality resins for heavy-duty varnishes. They offer faster drying, increased durability against wear and erosion. Typical applications of resins include industrial flooring, bowling alleys, boats. Olefins are also being used profitably in the manufacture of rubber chemicals, germicides, insecticides, dyes and surface active agents.

Your own business may have use for these or any one of a wide variety of Atlantic petrochemicals. Our sales engineers will gladly work with you in putting any of these chemicals to work in order to improve your present product, develop new products or to speed production—with cost-cutting savings as the result.

For full information, write or wire The Atlantic Refining Company, Dept. H-2, at the nearest office listed.

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ATLANTIC
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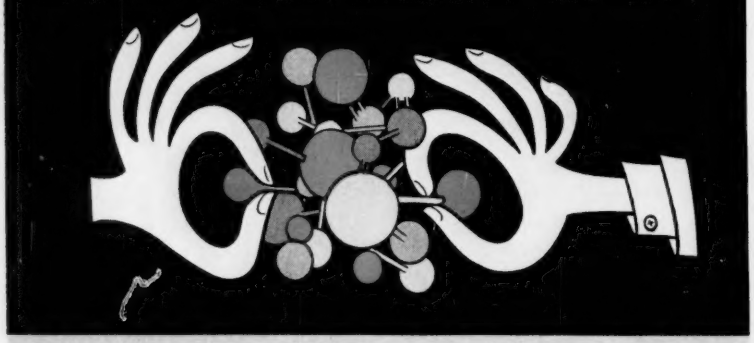
MIN CHEMISTRY *at work*

case: Sticky chemicals--and how a small quantity of M&C anti-caking agent will keep them free-flowing



Waxy, hygroscopic, sticky chemicals can clog up mills, form hard masses in plant equipment, ruin "shelf life," or make products hard to use.

Conditioner Report: **M & C anti-caking agents are low-priced, neutral-colored, uniform, ultra-fine, grit-free, water-insoluble, inert materials. Through coating with these powders that stick where they're put, chemicals are "conditioned" against "tombstoning" caused by time of storage, pressure, atmosphere, temperature fluctuation, etc.**

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SPECIALTIES

anyone else in the field is Sugar Beet Products Co.† (Saginaw, Mich.). Sugar Beet's SB-S3 is the nation's biggest seller, goes only to industrial users. Although competitors concede that SB-S3 is a better-than-average product, Sugar Beet is inclined to credit much of its success to mechanical dispensers. "Plant managers like dispensers," a company spokesman says. "Nobody ever knows where to find a loose can, and it has a way of getting out of the plant." SB has what it considers to be the first practical dispenser (one, incidentally, that doesn't work well with other cleaners)—the company feels this is a real jump on competition.

More important for industrial sales, probably, is price.

Typical is the thinking of American Telephone and Telegraph Co., which buys large amounts of the waterless cleaners, mainly for linemen. AT&T recently bought a 3-minute cleaner instead of the more expensive 1-minute product recommended by its lab. "What're those guys going to do with another 2 minutes?" asks an AT&T purchasing man.

The usual pitch to industrial customers is that the cleaners will save production-cutting trips to the washroom. But one cleaner maker privately admits that in practice workmen tend to use the cleansers, then go to the washroom. "You can't keep people from loafing," he says.

Formulation Foursome: The four primary types of cleaners are (1) those based on wetting agents, in combination with mild solvents (the Air Force ranks these best); (2) those made with aliphatic solvents (ranked second by the AF); (3) those made with aromatic solvents (third ranked); and (4) those made with alkali or ammonia.

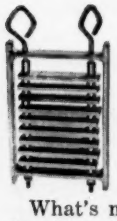
Common formulations are simple emulsions of kerosene and water, with additives to stabilize them against freezing, increase shelf life, improve rinsing and detergent qualities. Most common product problem: poor

†Among the other more prominent manufacturers: G. H. Packwood Manufacturing Co. (St. Louis); Great Stuff Products Co., (West New York, N.J.); Hammonds Products, Inc. (Fort Wayne, Ind.); Lightfoot-Schultz Co. (New York); all with industrial products and the Utility Co. (New York); Quickee Products, Inc. (Yonkers, N.Y.); Firestone Tire & Rubber Co. (Akron, O.); Nixon Labs, Inc. (Chicago); with consumer products.

Here's a crystal ball

that accurately predicts metal performance at high temperatures:

Inco's in-plant test rack program



Do you know that Inco sets up a test rack containing a large selection of alloys in critical hot spots in many types of operations: — one rack or more . . . whatever it takes to find out which alloy stands up best under a host of varying high temperature conditions.

What's more, Inco's High Temperature Engineering Service tabulates the data . . . analyzes it in a report like the one above: complete . . . accurate . . . unbiased.

Perhaps the answer to your high temperature problem has already been found . . . if not, we will be glad to arrange for a rack test. All you have to do to get the crystal ball rolling is to fill out the coupon below. Do it now.

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67 Wall Street, New York 5, N. Y.

Please send me the High Temperature Work Sheet so that I may outline my problem to you.

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55% Copper as metallic. Light and dense grades.

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37% Copper as metallic. Available in poly-lined drums or bags.

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Minimum 76% Copper as metallic. Technical grade . . . NOT A BY-PRODUCT.

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LIQUID SULFUR DIOXIDE
Highest commercial quality, available in tank cars, tank wagons, ton cylinders and 150-lb. cylinders.

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Iron less than 1.0 ppm as loaded. Water white. Delivered in glass-lined tank wagons, also in stainless steel drums.

SODIUM HYDROSULFITE
T-C HYDRO is a dry, white, free flowing, crystalline powder of uniform particle size and structure. It is dust free, assuring highest stability and uniformity.

PARA TOULENE SULFONIC ACID, ANHYDROUS
Other organic Sulfonic Acids.

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MONOHYDRATED ZINC SULFATE
36% Zinc as metallic. White, free flowing powder.

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Secondary Zinc Oxide.

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FERRIC IRON SULFATE
Partially hydrated, free flowing granular form. Available in bags or bulk.

•

MANGANESE

MANGANESE SULFATE
65% Mn SO_4. Designed specifically for inclusion in mixed fertilizer.

MONOHYDRATED MANGANESE SULFATE
93% Mn SO_4, H_2O. Highest purity, technical grade . . . NOT A BY-PRODUCT.

MANGANOUS OXIDE
Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

freeze-thaw stability and poor shelf life.

The products, which have to be strong enough to remove ink, grease, paint and the like, and which are then only wiped (not washed) off, have a tendency to irritate the skin. The wetting agent-mild solvent combinations seem least irritating, and one of this type was judged by the USAF to be not only nonirritating, but a faster worker than any of the others.

Another way to solve the irritation problem, particularly the cleaner's drying effect, makes use of lanolin. AT&T, in its specifications, demands a minimum of 0.25% lanolin. One maker, however, found its product had too much lanolin. Lightfoot-Schultz Co. (New York) has withdrawn its cleaner temporarily because workmen complained that it leaves hands too "slick."

Another complaint from factory workers is that the cleaners soften hands, make them tender. Others leave dirt around fingernails. Biggest complaint, however, is unpleasant odor and "after feel." Residue literally leaves users with a case of "butterfingers."

Slippery hands, something of a problem with all the cleaners, is also a complaint sometimes heard among one of the fastest growing groups of consumers: typists and other office workers. This group uses the products to remove carbon-paper and typewriter-ribbon smudge, generally buys from makers of carbon paper or typewriters (whose salesmen use it as an excuse for more frequent visits).

It is in the office market that the aerosol form has come closest to gaining a foothold. Introduced about two years ago, the sprays have never really taken hold. Cost is their main handicap—at $1.50 for 10 oz., they're too high, even for retail buyers.

Most producers feel that the home consumer market, for either aerosol or cream type, has never been fully exploited. Women have never been brought into the market to any appreciable degree, and even many men don't realize there are readily available dry cleaners to remove grease, paint and ink. Many in the industry feel that a lucrative market awaits anyone with enough capital to win the householders' favor.

Wax for Acrylics

Now going to autobody shops and new-car dealers—and destined for retail markets by March—is a new auto wax developed by Garry Laboratories (Buffalo, N.Y.) for use on acrylic lacquer-finished automobiles (*CW, March 10, '56, p. 73*). The wax is also said to do a good ob on regular finishes and to hold up extremely well under buffing wheel polishing.

The wax, tabbed Garry's Cream Wax, has an aliphatic solvent in place of the more usual aromatic, contains silicones as well as such waxes as carnauba, montan, microcrystalline, beeswax and others. Wax content is high—about 40% more than standard, according to James Garry, company president.

One of the big advantages claimed for the wax is the fact that it can be used to remove road tar smears without marring acrylic finishes. In the past, this problem has forced autobody shop finishers to use kerosene to remove spots; has forced some manufacturers of tar remover to reformulate their product.

The new wax now goes to professional shops for $10/gal. When it goes into consumer outlets, it will carry a $3/pint price tag. A pint, depending on the polisher, is good for 2 or 3 complete auto wax jobs.

EXPANSION

Newcomer: Larc Products Inc. (Amsterdam, N.Y.), a company organized to produce acrylic sheets—trademarked Larcrylic—is now going into production. The sheet will be produced in clears, whites and colors.

•

Northern Bright Lights: Cataphote Corp. (Toledo, O.) has formed a new company, Cataphote Ltd. at Toronto. Plans are to manufacture glass reflecting beads for highway marking. The demand for such highway stripping is said to be growing faster in Canada than in the U.S.

•

Candlenut Anyone? Ballthrall Trading Co. (Philadelphia) is ready to begin importing candlenut oil, a product of Tahiti. The material is some times used as a substitute for linseed oil, can also be used in manufacturing soap.

Improved latex for paper coating . . .

FORTIFIED DYLEX® K-52

Koppers has developed a new, greatly improved styrene-butadiene latex that is FORTIFIED **during polymerization** to give it exceptionally good binding strength.

This new FORTIFIED DYLEX K-52 Latex gives you a coating with . . .

IMPROVED SMOOTHNESS

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DYLEX K-52 improves the flow of casein during application of the coating . . . gives the starch better water resistance . . . and retards picking. It works well in both on-machine and off-machine coatings.

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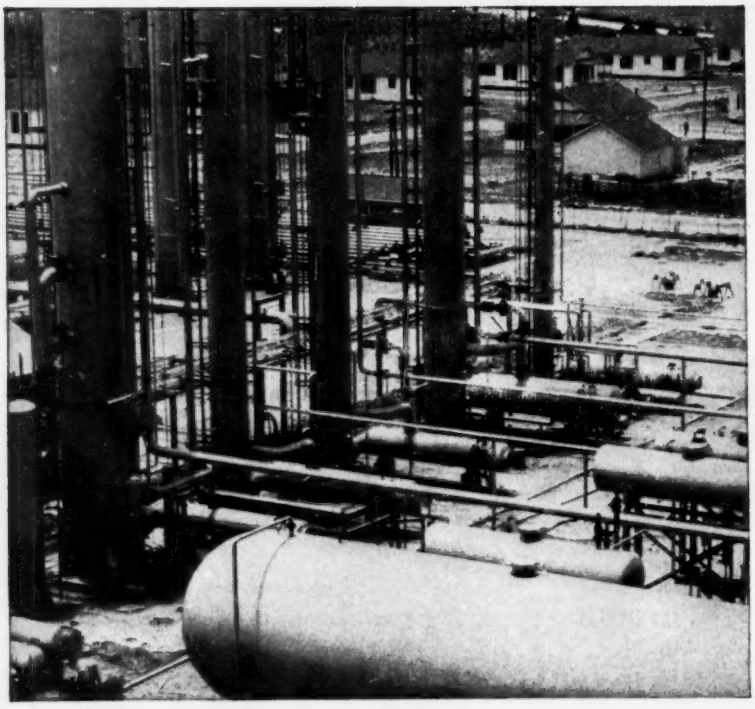
Pipe, fittings and linings of Lead cost much less, give better protection



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They are more efficient because lead is self-healing. Scratch it in the presence of many acids and a protective coating immediately re-forms. There is no focal point at which corrosion can set in.

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SPECIALTIES

EXPANSION

Push on Water-solubles: Morningstar Nicol, Inc. has just dedicated new plant facilities in Hawthorne, N.J., which will triple its capacity for producing water-soluble gums.

•

Move to Holland: Archer-Daniels Midland Co. (Minneapolis) has purchased an interest in Scado Kunstarsindustrie, N.V., a leading Dutch manufacturer of resins and plasticizers. The name will be change to Scado-Archer-Daniels, N.V.

•

Emphasis on Aircraft: A quarter-million facilities expansion has been announced by Narmo Resins and Coating Co. (Costa Mesa, Calif.). The expansion, which will increase substantially the firm's output of aircraft structural adhesives and laminating materials, is scheduled for completion in March.

•

Branching to Goshen: Treplow Products (Paterson, N.J.) plans to build a branch plant for detergent manufacture at Goshen, N.Y. A one-story plant, employing approximately 50 people, will be built on a recently acquired 34-acre plot.

PRODUCTS

Sprayed Shoeshine: Huss Brothers (Chicago) is offering a 6-oz. aerosol which is said to provide up to 100 shines for shoes. Retail price: $1. The material is sprayed on cleaned shoes, dries to a high gloss in one minute. It's claimed to be colorless, nonsticky and noncracking.

•

Tube for Typists: Underwood Corp. has begun packaging its waterless, lanolin-based hand cleaner, designed for removing carbon smudges and ink stains, in collapsible polyethylene tubes.

•

Anti-static Aerosol: A new anti-static spray for phonograph records has just been introduced by Miller Mfg. Co. (Libertyville, Ill.). A cellulose sponge is included, along with the 5-oz. spray can. The material is to be nationally distributed, will sell for $1.50.

•

Whisker Wilter: Designed to remove facial oils, a pre-shave cream beard

softener called "It's a Pleasure," is being marketed by Pleasure Products of Hollywood, Calif. The compound, said to contain no soap, is applied and rinsed off before use of regular shave cream. A 4-oz. tube of the new product sells for $1.

•

The Midas Touch: A ceramic 22-carat gold finish for architectural use has been developed by the Bettinger Corp. (Waltham, Mass.). The company says a new method of applying a very thin layer of gold makes the product competitive in price with other finishes.

•

Non-Ionic Surfactant: High detergency in low concentrations (5 oz./100 gal.) is claimed for a nonionic surface active agent, Synthrapol PWS, recently announced by Arnold, Hoffman (Providence, R.I.). The compound is especially recommended to textile makers for soaping-off and cleaning-up stained prints, and for starch desizing operation. It also is said to be highly effective as a woolen piece-goods detergent and as a scouring agent for raw wool.

•

For Jells: A new thixotropic vehicle for interior finishes is being produced by Archer-Daniels-Midland Co. The material, called Arothix 4000-ML-40, was developed for use in "jell" flat wall paints, wall-primer sealers and enamel undercoats. It can be used in amounts up to 25% to modify other architectural type finishes.

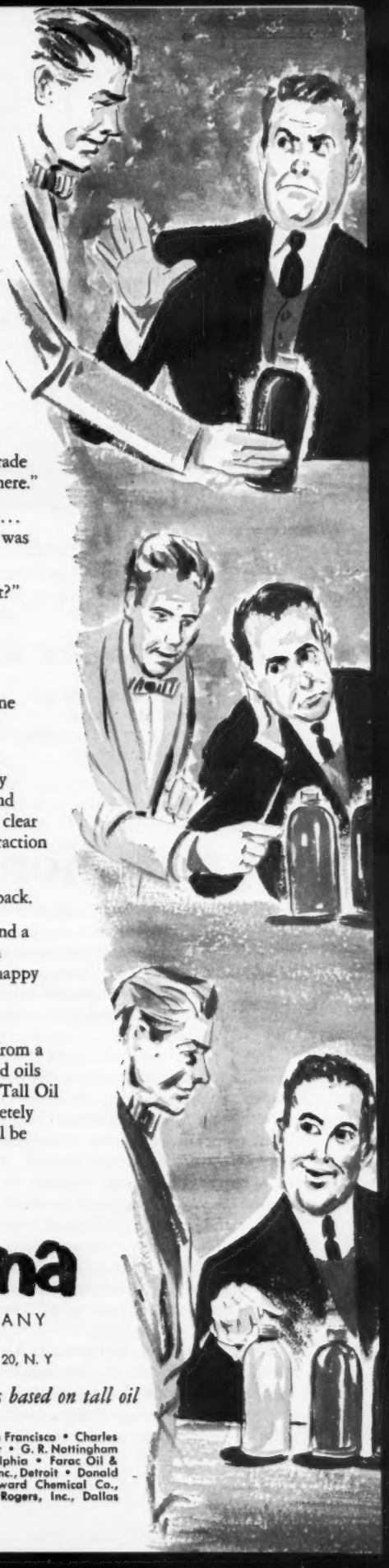
•

Dye for Plastics: Farbwerke Hoechst (Frankfurt, Germany) has developed a new red dyestuff, PV-Echt-Rot, for dyeing PVC, polyethylene and other plastics, including those with high softener content.

•

Viscosity Stabilizer: Aceto Chemical Co. (Flushing, N.Y.) is now marketing Solaset, a sodium salt of a sulfated ethoxylated fatty alcohol. Applications: as a raw material for the preparation of liquid and lotion shampoos, household liquid detergents and liquid foaming agents. It can be used with a wide range of anionic sulfated or sulfonated compounds as well as with fatty acid mono- and di-alkylolamides, according to the company. Aceto says the material will maintain its viscosity on addition of water, small percentages of salt or Na_2SO_4.

The man who changed his oil!



First time it was strictly no-go. "Sorry," said the P.A. . . ."price is fine but we're producing quality products from top-grade materials. No room for crude products here."

"But—" we said for the umpteenth time . . . but we had lost our audience. The P.A. was off and away.

Second time, the gimmick. "What's that?" said the P.A., pointing to the bottle of black sticky mess placed on his desk.

"You run your car with it," we said.

"Not at all," said the P.A., "I use gasoline of course."

"This gasoline," we told him, placing a second bottle on his desk, "is a carefully selected fraction of that crude oil . . . and this (producing a third bottle of light clear oil) is a carefully distilled Tall Oil Fraction which we think you can use."

"Tell me more," said the P.A. leaning back.

Third time it was the big welcome . . . and a question. "Say, can we buy our grade in tank trucks? Production and Sales are happy and costs are down. We're planning larger purchases."

Possibly your operation could benefit from a "change of oil" . . . for where unsaturated oils and fatty acids are needed, ACINTOL® Tall Oil Fractions are lower in cost and completely dependable in quality and supply. We'll be happy to furnish samples and technical assistance.

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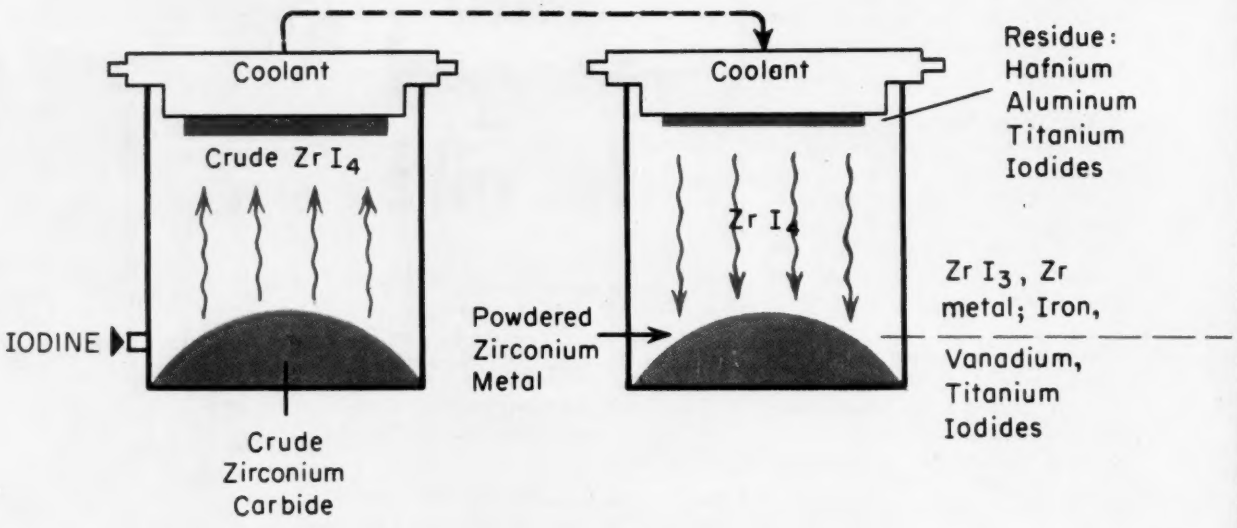


1. CONVERSION

Iodine gas converts crude zirconium carbide into crude zirconium tetra-iodide, which condenses on lid.

2. REDUCTION

Solid zirconium tetra-iodide sublimes under vacuum at 500 C, reacts with powdered zirconium metal, forms zirconium tri-iodide, leaves some impurities behind.

Separation by Stages—New Bid

Take the principle sketched above, substitute chlorine for iodine, and you get an idea of the zirconium process U. S. I. may soon give a tryout at the 2-million-lbs/year zirconium plant now being built in Ashtabula for July startup.

Developed in Australia by the Commonwealth Scientific and Industrial Research Organization, the process involves selective reduction of zirconium tetrahalides to the trihalides. (Zirconium is reduced preferentially.) Last fall U.S.I. decided to take an option on the process, said it would be installed in Ashtabula—if the method lived up to expectations. U.S.I. still hasn't revealed any decision to exercise its option. But it's a safe bet that the answer will be "yes."

Improvement on Extraction: Although zirconium and hafnium behave the same way under most conditions, they differ in one important respect: hafnium has a high neutron absorption rate, whereas zirconium's is low. That means zirconium for reactor construction must be hafnium-free. The best present separation technique is the Bureau of Mines-developed solvent extraction, the method that U.S.I. will use in its initial operations.

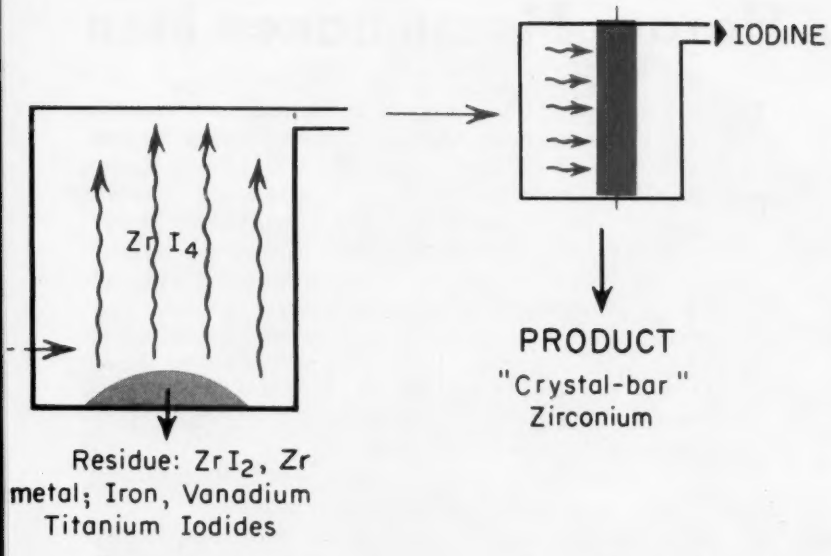
On paper, at least, the Australian process would seem to have an edge. Neither the Australians nor U.S.I. are saying anything about the process except that it involves chloride reduction. An Australian patent (4831), however, shows how it can be done.

The patent covers only an iodide process. But there's no reason why chlorine wouldn't work in much the same manner. In fact, CSIRO has been working with chlorine since the iodide patent issued two years ago. A single reduction and disproportionation cycle reportedly gives 80% recovery of the crude zirconium chloride feed, a hafnium content of 500 ppm. These results are considered excellent. But another cycle would be required to drop the hafnium content below the AEC specification of 60 ppm. If the process can be improved to do the job in a single cycle, it would be the first to take that honor.

Step by Step: In the first step, zircon sand* is converted into zirconium carbide by heating in an arc or graphite-resistor furnace with carbon. The carbide is transferred to a closed reactor having a cooled lid. Iodine (or chlorine) gas passes over the heated carbide, reacts with it to form the zirconium tetrahalide. The cooled reactor lid condenses the tetrahalide gas and is transferred to a second reactor containing powdered zirconium metal.

Heated under vacuum, the solid zirconium tetrahalide sublimes, reacts with the powdered zirconium and is reduced to the trihalide. The iron and vanadium halide impurities are re-

* The orthosilicate, $ZrSiO_4$ (theoretically—67.2% ZrO_2, 32.8% SiO_2). Considered the best source of zirconium, it's found in great abundance in Australia.



3. DISPROPORTIONATION

Zirconium tri-iodide disproportionates under vacuum at 350 C, forms pure zirconium tetra-iodide gas, leaves impurities behind.

4. DISSOCIATION

Zirconium tetra-iodide gas passes through dissociation chamber, deposits pure zirconium on hot wire.

for Pure Zirconium

duced, too. But the hafnium and aluminum halides aren't.

As the reactor cools, the zirconium trihalide and the iron and vanadium impurities collect at the bottom as solids along with any unreacted zirconium metal that remains. The hafnium and aluminum halides condense on the cooled lid of the reactor. (From 50 to 70% of any titanium halide present also condenses. The rest is reduced to the dihalide along with the zirconium.)

Impurities on the lid are removed. The zirconium-containing solids at the bottom of the reactor are reheated under vacuum—but to a lower temperature. Zirconium trihalide disproportionates, part to the tetrahalide and part to the dihalide.

The tetrahalide is removed as a gas for final processing to the pure zirconium metal. The dihalide remains behind with the other solids—iron, vanadium and titanium halides, and unreacted powdered zirconium. This residue is used as the reducing agent for the next batch.

Engineering Needed: There's no chemical reason why chlorine should not substitute for iodine in the Australian process. But from an engineering standpoint, translating the batch iodide process described in the Australian patent to a commercial process using chlorine is quite a trick.

One producer, for instance, says he tried to convert an iodide process to chlorine and, after several attempts, gave up.

Actually, the whole field has not been thoroughly explored and there's disagreement about the relative rates of reaction. Example: the patent says that the tetra-iodide is reduced at 500 C, while disproportionation takes place at 350 C. Experience, however, indicates that the chlorine reactions go at lower temperatures. Reduction of the tetrachloride can be carried out at about 400 C. And because the lower chlorides are thought to be less stable than the iodides, they probably would disproportionate at lower temperatures.

But some feel that the chlorides are more stable, require higher temperatures. They point to the well known tetra-iodide dissociation, first carried out by van Arkel in 1925. Zirconium tetra-iodide dissociates, deposits zirconium crystals on a hot filament. But the tetrachloride will not dissociate readily. In fact, this may be why CSIRO developed the iodide process before turning to the chloride.

Fitting In: Regardless of the advantages of a tetra-iodide dissociation step, a chloride process has a wide edge. Chlorine is considerably cheaper than iodine. Processors are less reluctant to use it—its handling techniques are more familiar than those for iodine. Too, U.S.I. has a captive source of chlorine at Ashtabula.

And in U.S.I.'s case, a dissociation chamber for the tetra-iodide process would be an extra piece of equipment. Its sodium-reduction process, like the Kroll process, will handle pure zirconium tetrachloride readily—so only the conversion, reduction and disproportionation steps are needed.

If the CSIRO hafnium separation process goes commercial at Ashtabula, it will only be the third to do so in the U.S. The Mines Bureau process U.S.I. will first use has been in Carborundum's Akron, N.Y., plant since 1953. National Research has the other process, will be on-stream at Milton, Fla. by September. No details are available except that the process is continuous, may involve an extraction step, will be integrated with a Kroll batch-reduction process. Capacity of 1½-million lbs./yr. will be greater than the Kroll capacity, which will be enlarged as the volume warrants. NR's initial price to AEC will be slightly higher than U.S.I.'s.

Emphasis on Cost: The main reason U.S.I. wants to get the Australian process into the production line at Ashtabula is cost. It's offering zirconium sponge to AEC at what is believed to be the lowest price (said to be $4.53/lb.) of any firm. This is based on its sodium reduction process instead of the Kroll. How much the Australian hafnium-separation method could cut that price is not known—but it could be considerable.

Growing Pains Harass Maintenance Men

"Maintenance dilemma: Job is growing bigger . . . skilled labor force is shrinking."

"Lack of planning hampers efficient use of maintenance, runs up costs."

"Routine preventive maintenance facilitates scheduling, saves maintenance time and money."

"Careful selection of trainees is key to building a maintenance staff, upgrading unskilled personnel."

WAYS and means of keeping production equipment operating efficiently, economically and dependably are holding the spotlight this week at the 8th Plant Maintenance & Engineering Conference in Cleveland. At Monday's opening session, conference chairman L. C. Morrow, consulting editor of Factory Management & Maintenance, cited the valuable contributions that maintenance engineers have made to industry, outlined three major problems that lie ahead:

- The job to be done by maintenance is bigger than ever. Firsthand reports from manufacturing companies indicate that expenditures for capital equipment in 1957 will be 14% above the record-setting outlays of last year. This increase, says Morrow, will put a correspondingly heavier burden on industry's shorthanded maintenance teams.
- There are too few people to do the job. Industrial maintenance is the second-largest recruiter (building trades take more) of skilled labor. And, though the nation's skilled labor force now numbers more than 9 million workers, replacements from training and immigration are adding only 100,000 men each year, while losses from death, retirement and transfer annually subtract 250,000.
- The maintenance job is not being done as well as it should be. According to a survey of 40 plants whose maintenance costs range from $250,000 to $1.5 million annually, said Morrow, maintenance work is not utilized efficiently. All of the 40 plants lacked trained maintenance engineers; only one has a man with formal engineering training in charge of maintenance. Other common abuses disclosed by the survey: ineffective or nonexistent budgeting of maintenance expenditures, awarding maintenance contracts for construction or repair without competitive bids, lack of storeroom records, inefficient budgeting of maintenance workers' time.

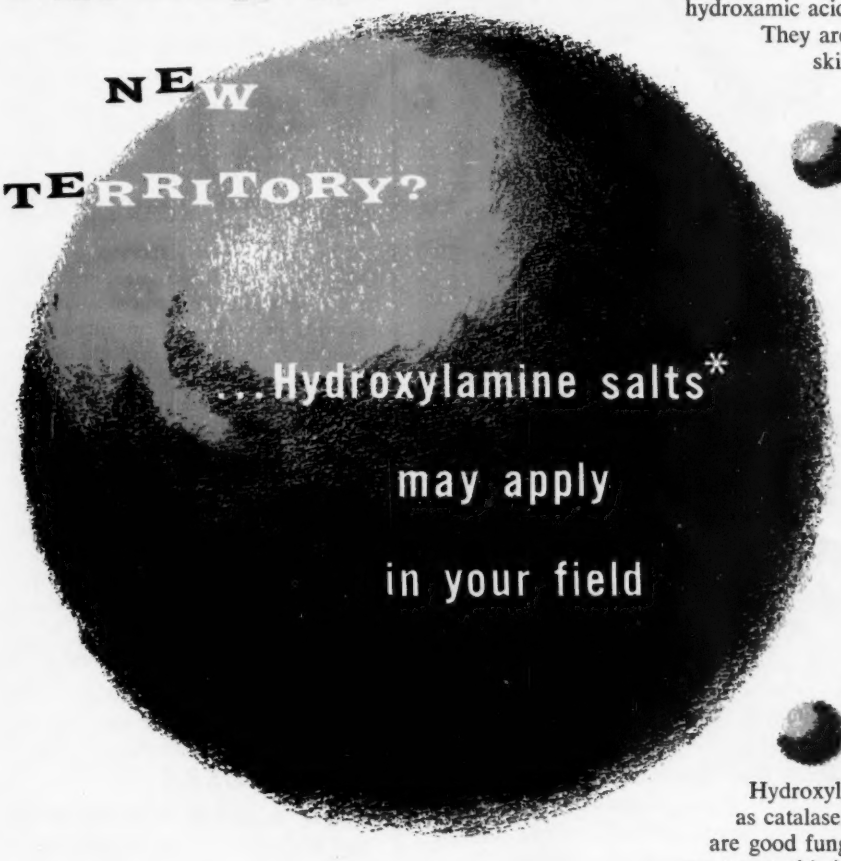
The problems are serious enough to be alarming, warned Morrow, but they're not insurmountable. Eight years ago, maintenance had practically no standing with management—today it's gaining stature, still has a long way to go.

Preventive Maintenance: To be successful in a modern, heavily mechanized industry, said Armco Steel Corp.'s Fred M. Gross, maintenance programs must be developed around a sound, well planned and closely supervised preventive maintenance nucleus. And the key to such a program is planned inspection. Routine inspection not only detects minor flaws before they cause major breakdowns, said Gross, but also enables manpower scheduling that minimizes costly overtime through more efficient use of man-hours.

Staff Building: Training personnel for the maintenance team is one of the most pressing tasks facing industry today. An idea of what it takes to keep a large maintenance organization up to staff was described by Dow Chemical Co.'s maintenance education director Ralph G. Smith.

The first—and perhaps the most important—phase of a training program, said Smith, is the selection of technical personnel. Dow has 80 recruiters who contact 150 technical schools annually; its technical employment department hires about 6 out of every 100 applicants, estimates it will have to recruit 450 technicians this year. At present the company has unfilled requisitions for 20 engineers

EXPLORING NEW TERRITORY?



For synthesis—
Hydroxylamine salts may be used to make oximes, hydroxamic acids, and numerous intermediates. They are useful for preparation of anti-skinning agents, anti-rusting agents, and pharmaceuticals.

As acid-stable reducing agents— For metallic ions such as ferric, cupric, silver, and for nonmetallics such as dyes, peroxides, and nitrites. These compounds are useful in purification processes, dyeing of acrylic fibers and as a short-stopper for catalyzed polymerization reactions.

As oxidizing agents—
This is new territory that needs exploring. Hydroxylamine salts are probably mild oxidizing agents.

Effects on proteins and biological systems—
Hydroxylamine salts inhibit enzymes such as catalase, harden gelatine . . . derivatives are good fungicides and bactericides. For the most part, this is a poorly explored area suitable for intensive experimentation.

***Hydroxylammonium Acid Sulfate**
$NH_2OH \cdot H_2SO_4$
Hydroxylammonium Sulfate
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Hydroxylammonium Chloride
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Already known for their wide range of utility, these nitroparaffin derivatives may find dramatic uses from future research. Their potential applications for experimentation are almost unlimited.

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McGRAW-HILL PUBLICATIONS

PRODUCTION

in the Shops and Services Department, needs 40 more for its Engineering Department.

New maintenance engineers are rotated throughout the various shops to familiarize them with the problems and personnel, are assigned as openings occur. In addition, college graduates in the maintenance department participate in Dow's supervisory development program.

To make up for a shortage of trained electrical and instrument engineers, Dow conducts classroom-laboratory courses in basic and advanced electronics, trains journeyman electricians and electrical foremen to take over instrument maintenance. And nonsupervisory maintenance personnel are recruited from the unskilled labor force, trained under company-union contract to fill the gaps in specific maintenance trades. Because each nonsupervisory trainee is a potential foreman, said Smith, it's essential to have a rigid selection procedure. Good selection means lower turnover, lower training costs, higher morale and more output—in short, better maintenance service.

PROCESSES

Acid Recovery: Steel processors may find at least a partial solution to high pickling costs and waste-disposal problems in a new pickle-liquor recovery process offered by Koppers (*CW Technology Newsletter, Dec. 29, '56*). Recently perfected by Zahn & Co. (Germany), the process treats pickle liquor continuously to remove iron salts, maintain acid concentration in the optimum range. Key: controlled crystallization that precipitates ferrous sulfate as the monohydrate. Here, according to basic patents (2,662,812 and 2,668,130), is how it works:

Pickle liquor flowing concurrent to the steel strip is withdrawn continously from the last pickling tank, pumped through a filter to remove scale and other solids. Clear liquor then flows to a mixer in which it's blended with fresh concentrated sulfuric acid. The resulting increase in temperature and acid content lowers the saturation point of the dissolved iron salts.

Pickle liquor is concentrated by spraying into a stream of hot (2000 F) air flowing to a centrifugal evaporator. Exhaust air from the evaporator is

scrubbed with waste rinse water to remove entrained acid; concentrated liquor is fed to a settling tank for separation by decantation from the precipitated ferrous sulfate monohydrate. Crystals of the latter are withdrawn from the settling tank, stripped of entrained pickle liquor by a rotary disk filter and dried with hot air. (Recovered monohydrate is non-hygroscopic, can be used for fertilizer, iron oxide pigments, production of iron powder for powder metallurgy, or sintered for feeding to blast furnaces.)

Pickle liquor, decanted from the settling tank, flows to a dilution tank where waste rinse water from the system is added to bring the acid concentration to 14-20% (by volume of 100% H_2SO_4). After its temperature is adjusted to 200-210 F, the regenerated liquor is pumped back to the first tank in the steel-strip pickling line.

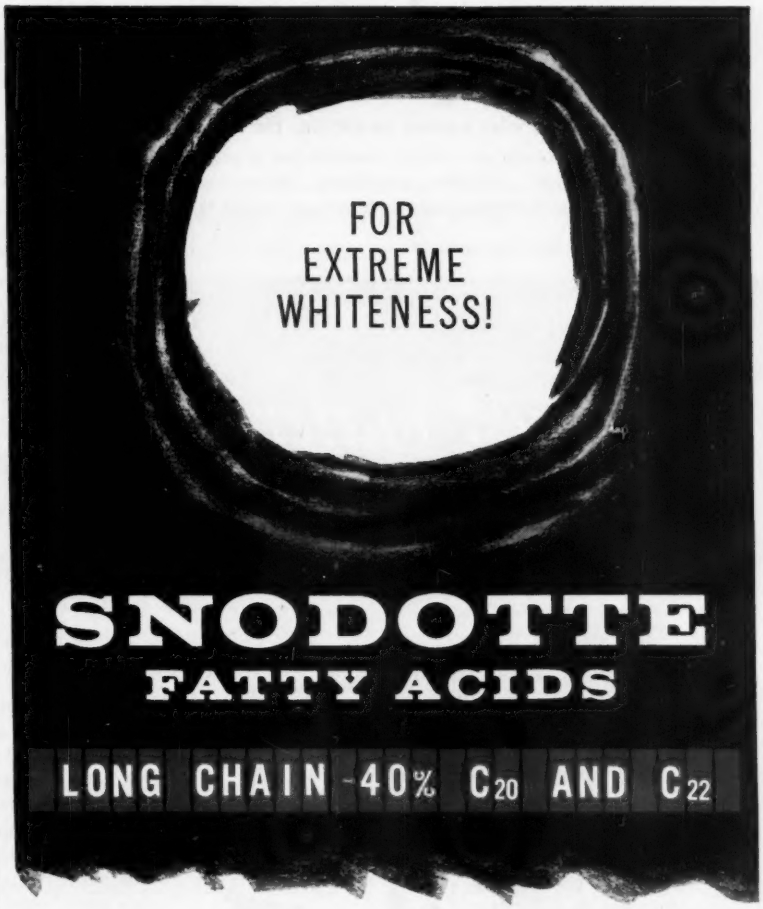
Besides eliminating the problem of spent-acid disposal, the continuous regeneration of pickle liquor is said to promote faster, more uniform pickling, to eliminate the build-up of hard-to-remove deposits of ferrous sulfate heptahydrate.

EQUIPMENT

Automatic Accuracy: Beckman Instruments, Inc. (Fullerton, Calif.) has just brought out the Zeromatic (T.M.) pH meter that's designed, it says, to minimize operator error. The instrument features automatic correction for electronic zero drift, rapid push-button control. It's equipped with a 0-14 pH scale, two millivolt ranges (700-0-700 mv. and extended 0-1400 mv. ranges), and a drift-free amplifier that adapts to potentiometer recorder output, automatic temperature compensation and Karl Fischer titrations.

•

Radiation Monitor: A combination area-personnel-equipment monitor for detecting changes in radioactivity level is now available from Nuclear Measurements Corp. (Indianapolis). Called Nucliguard, the unit sounds a warning whenever radiation exceeds a preset level. The compact (15-lb.) monitor has a sensitivity of 50-50,000 counts/min., comes equipped with an extendable (to 6 ft.) gamma-sensitive scintillation probe or beta-gamma-sensitive GM probe.



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Iodine Value	3 max.
Saponification Value	194 to 199
Average Molecular Wt.	282 to 289
Specific Gravity @ 100/25°C	0.832
Color 5¼" Lovibond	Max. 10/1R

With a 3 maximum iodine value, SNODOTTE Acids give you products that won't darken or oxidize. With a maximum 10Y/1R Lovibond rating, you can visualize the extreme whiteness of SNODOTTE. It's a long chain acid (40% C_{20} and C_{22}) with excellent coupling qualities and contains no polyunsaturated acids. SNODOTTE is second to none for high quality aluminum stearates, lubricating greases and plastics. Write on your letterhead for a sample of SNODOTTE, along with full technical information.

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Mallinckrodt was the first chemical firm to produce pure uranium oxide on a commercial scale for the Manhattan Project, starting back in 1942 . . . and that Mallinckrodt is one of the major producers of refined uranium for the Atomic Energy Commission today.

But he may not know that . . .

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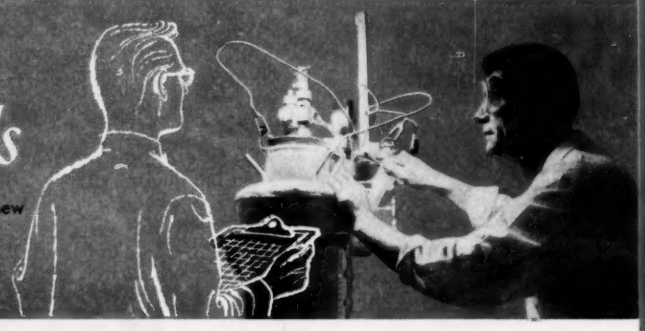
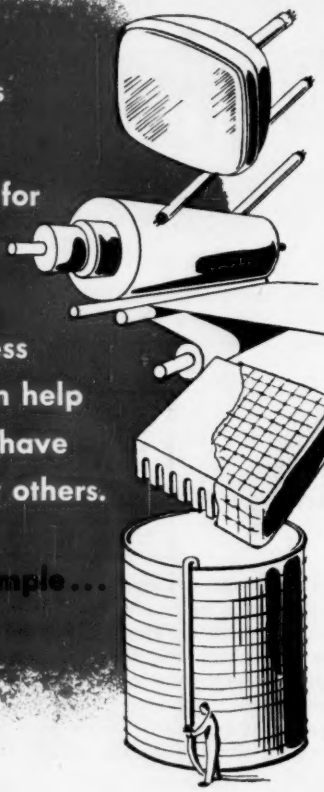
atomic fuel materials

Keeping pace with the atomic era, Mallinckrodt opened its new Special Metals Division plant at Hematite, Missouri, in September, 1956 . . . with facilities to produce uranium compounds for reactor use.



Mallinckrodt's **experience** and facilities for producing **carloads** of pure process chemicals can help you, as they have helped many others.

For example...



Electronic chemicals require an unusually low level of impurities and a high degree of uniformity with special physical properties. For television tube phosphors, for instance, Mallinckrodt *silicic acid* is manufactured in three different physical forms to meet the industry's specific demands. For the manufacture of transistors and other semi-conductor devices, Mallinckrodt supplies TransistAR* chemicals with low heavy metal content.

Stearates. Mallinckrodt stearates are used extensively in industry. *Calcium stearate* improves the plasticity of starch-clay coated papers. *Aluminum stearate* is used in the manufacture of lubricating greases, *magnesium stearate* as a tableting lubricant, *sodium stearate* in cologne and deodorant sticks, and *zinc stearate* as an internal lubricant in plastics.

Potassium sulfate supplied by Mallinckrodt plays an important part as an electrolyte to control the degree of polymerization in the manufacture of synthetic latex rubber. It is also used in the manufacture of dry cell batteries and to regulate setting time of gypsum slurries in the production of wall-board.

Gallotannins. Because of the high purity of Mallinckrodt *tannic acid*, it is used extensively to clarify and stabilize wine and other beverages. Gallotannins are also used in the manufacture of inks and dyes, and as photographic developers.

*Trademark

SPECIFY Mallinckrodt INDUSTRIAL CHEMICALS

when you want purity, uniformity, and specific physical form to cut processing costs or to upgrade product quality.

Mallinckrodt Chemical Works

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Technology
Newsletter

CHEMICAL WEEK
February 2, 1957

When Stauffer unveils its titanium process, this is what you will see: a hydrogen reduction of titanium tetrachloride to the trichloride; the trichloride is then disproportionated to form the metal and the tetrachloride at essentially room temperatures (or slightly higher). Normally, disproportionation proceeds only at elevated temperatures. But one of several catalysts can be used to increase rates to practical limits. (For a high-temperature disproportionation of a zirconium trihalide, see p. 58.)

But don't expect the firm to say anything about the process for some time. Although it has been quietly working on the method and has advanced it to the pilot stage (*CW Technology Newsletter, Nov. 10, '56*), it has never confirmed (or denied) an interest in the metal.

There's little doubt, however, but that the reactions outlined above encompass the method being tried. They would tie in, too, with Stauffer's recent decision to make the trichloride available in "hundreds-of-pounds" quantities. (*CW Technology Newsletter, Jan. 19.*)

•

There's still no word either from Sinclair on its X-Chemical fuel additive. But a recent Australian patent (18,661) describing the use of a tri-alkyl phosphine is undoubtedly significant.

The patent covers a fuel made up of high-octane gasoline (with tetraethyl lead) and from 0.2 cc. to 1 cc./gal. of one or more tri-alkyl phosphines.

•

One of the latest fuels to be used in rocket systems is Udetta, a mixture of unsymmetrical dimethyl hydrazine and diethylene triamine.

And if you don't believe that those new missiles are going to bulk big in the future of chemical technology, look at this: The Air Force Missile Test Center at Patrick Air Base (Florida) now has a 10-tons/day plant to make liquid oxygen (as an oxidizer in rocket fuels). And it will soon build a bigger one to keep up with the stepped-up missiles program. The by-product nitrogen from the plant, incidentally, is used for pressuring fuel and other systems.

•

International Nickel and Texas Gulf Sulphur are spelling out details of that pilot-plant project designed to extract elemental sulfur from sulfur dioxide (*CW, Dec. 29, '56, p. 31*). The pilot plant, slated to produce 10 tons of sulfur daily, will be set up near Inco's new iron recovery plant near Sudbury, Ont. It will, in fact, operate on dioxide produced in Inco's roasting operations there.

An economical process for getting elemental sulfur from sulfur dioxide would be a real bonanza in the U. S., too. It's possible now to

use the gas for the manufacture of sulfuric acid, of course. But the costs of shipping the acid (or liquefied sulfur dioxide) make it economically unthinkable in many cases.

American Smelting and Refining spent a lot of work developing such a process. The firm operated a pilot plant in Garfield, Utah, from 1940 to '43, where it reduced sulfur dioxide from its copper refining operations with coke. Although that didn't prove too satisfactory, ASR developed a process using natural gas reduction that looked so promising, the company was considering a 35-tons/day unit. But there was not enough natural gas available to it at the time to make the process attractive.

Texas Gulf will most likely start up with a reduction using oil rather than coal. Eventually, it hopes to have enough natural gas available to switch to that.

•

An atom-powered wrist watch? Elgin National Watch and Walter Kidde Nuclear Laboratories have developed an atomic battery they claim can deliver usable electricity continuously for at least a five-year stretch. And it's no bigger than the head of a thumb tack.

The battery, they say, operates well over the range of temperature found on the earth, is completely safe for extended personal use. It may find use in such articles as watches, miniature radios, hearing aids.

Two other atomic developments:

• The first U. S. nuclear power system designed solely for electric power generation experiments will be placed into operation next week. The experimental boiling water reactor (EBWR) at Lemont, Ill., is now being put through shake-down tests by its operator, the University of Chicago. On Feb. 9, it's slated to go into full operation, providing 5,000 kw. of electric power.

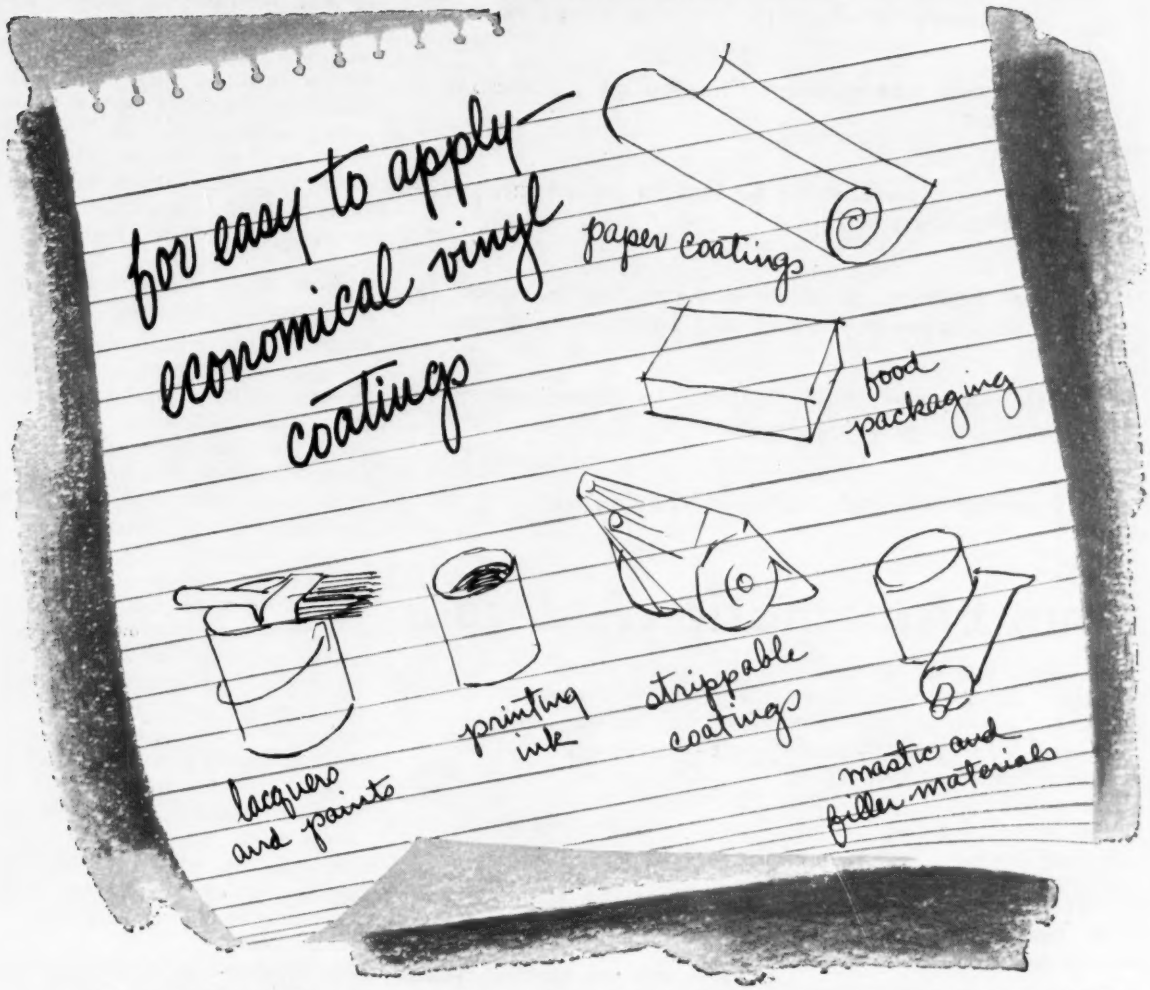
• On that same day, the first shipment of parts of a research reactor will arrive in Brazil. The swimming pool reactor, which was designed and is being fabricated by Babcock & Wilcox, will be used by the University of Sao Paulo. It's the first nuclear reactor to be built in Latin America and the biggest of the swimming pool type sent out of the country by the U. S.

•

Du Pont's Belle (W. Va.) works has completed installation and put into operation temporary equipment that will facilitate its switch to natural gas (*CW Technology Newsletter, June 30, '56*). The equipment just placed in operation uses 10 million cu. ft./day of gas. But this is only the beginning. The firm expects to put in further new gas-utilizing equipment next summer. Its over-all program will be completed in 1959, at which time it will be consuming 31 million cu. ft./day of gas.

News about

B.F.Goodrich Chemical *raw materials*



select "tailor-made" GEON SOLUTION RESINS

YOU now have a choice of four Geon polyvinyl resins specifically designed for resin solution application—to provide thin, economical coatings on wood, glass, metal, masonry, paper, and other materials.

ADVANTAGES

- Geon solution resin coatings withstand the effects of most acids and alkalis, salt water, corrosive atmospheres.
- The coatings are odorless, tasteless, non-flammable, and constitute a good vapor barrier.
- Application is very simple and economical—the solutions adhere tightly to surfaces when sprayed, dipped, brushed, or roll-coated.

"TAILOR-MADE" RESINS

A choice of four Geon resin materials permits matching your requirements in terms of function, desired film properties, and cost. For example:

Geon 222—completely soluble in low-cost solvents such as toluene.

Geon 427—general purpose non-reactive resin.

Geon 421—forms tough films with superior low-temperature properties.

Geon 400 x 110—excellent adhesive properties.

GET THE FACTS

A new booklet "Geon Solution Resins" contains complete technical data and application information. For your free copy write Dept. S-2, B. F. Goodrich Chemical Company, 3135 Euclid Ave., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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Posers in Purchasing Automation

- √ How will management thinking on purchasing be revised?
- √ Why must purchasing be last to adopt integrated data-processing?
- √ Can punched-card record-keeping become the bridge between manual and computer systems?
- √ How is automation helping to coordinate sales with production planning?
- √ How far will automation of buying go?

Found: Automation Answers

Automation held the spotlight at meetings of the Chemical and Allied Buyers' Group this week and last*.

On hand at one or the other session were four automation experts: Monsanto purchasing agent, Allan Frankel; Merck systems man, Ted Torgerson; Tennessee Eastman purchasing engineer, William Harrison; and International Business Machines' D. R. Jarema. They answered the questions that buyers are asking:

What adjustments in purchasing management will automation bring?

TORGERSON: Data processing will demand "management by exception" and full integration of buying procedures with other company operations. Computers store information, make comparisons and calculations. The computer can compare, for example, inventory against a set reorder point. If the inventory is an exception to the reorder value, it can write a requisition.

Automated buying will require the buyer to determine the data needed to run his job, to eliminate duplication in data usage and, perhaps, even to ask for changes governing policies of other company functions.

Conversion of existing systems to computer procedures probably won't work. But an interim arrangement using conventional punched cards or manual methods can set the stage for full automation, help purchasing agents make the most anxious adjustment of all—the long wait. Because purchasing supports sales and production, it will likely be among the last to become automated.

How will an interim system work?

HARRISON: Unlike a computer system, which processes data for production-planning and raw-material forecasts, the interim system aims more at keeping everyday purchasing records. Simple punched-card methods can store data for future reference or maintain current records of the status of transactions.

For future reference, information on orders (vendor, quantity, materials, etc.) is punched into cards. After shipment is received, cards are updated with such data as the actual quantity shipped, money paid and the unit cost. Records can be closed monthly to get fast strike-offs (by commodity and by vendor) of everything purchased. Special run-offs to show specific data (purchases from vendors by area) can also be made.

Status of requisitions received by purchasing and the orders placed can be similarly kept. Cards are punched for the requisition, updated when the order is placed. Correspondence containing delivery-status data is transferred to another set of cards. By closing order records weekly, the status of all requisitions or orders can be available for review in one day.

What can automation do now for production planning?

FRANKEL: Using sales estimates and a breakdown of internal divisional requirements, the production planning group charts a 12-month plan, by month, for some 500 products. The manually prepared plans are based on optimum operating conditions, plant capacities, inventory levels, vacations and other factors.

The plans are coded to punched cards, fed into a computer and stored on magnetic tape. The machine can then be programed to whip out a monthly production schedule, finished-goods inventory valuations, labor requirements. And, most important to the buyer, it gives a month-by-month analysis of raw-material requirements for each plant and for the division.

Some of the uses the buyer can make of the data: planning contracts, changing requirements, determining his container needs, calculating transportation needs.

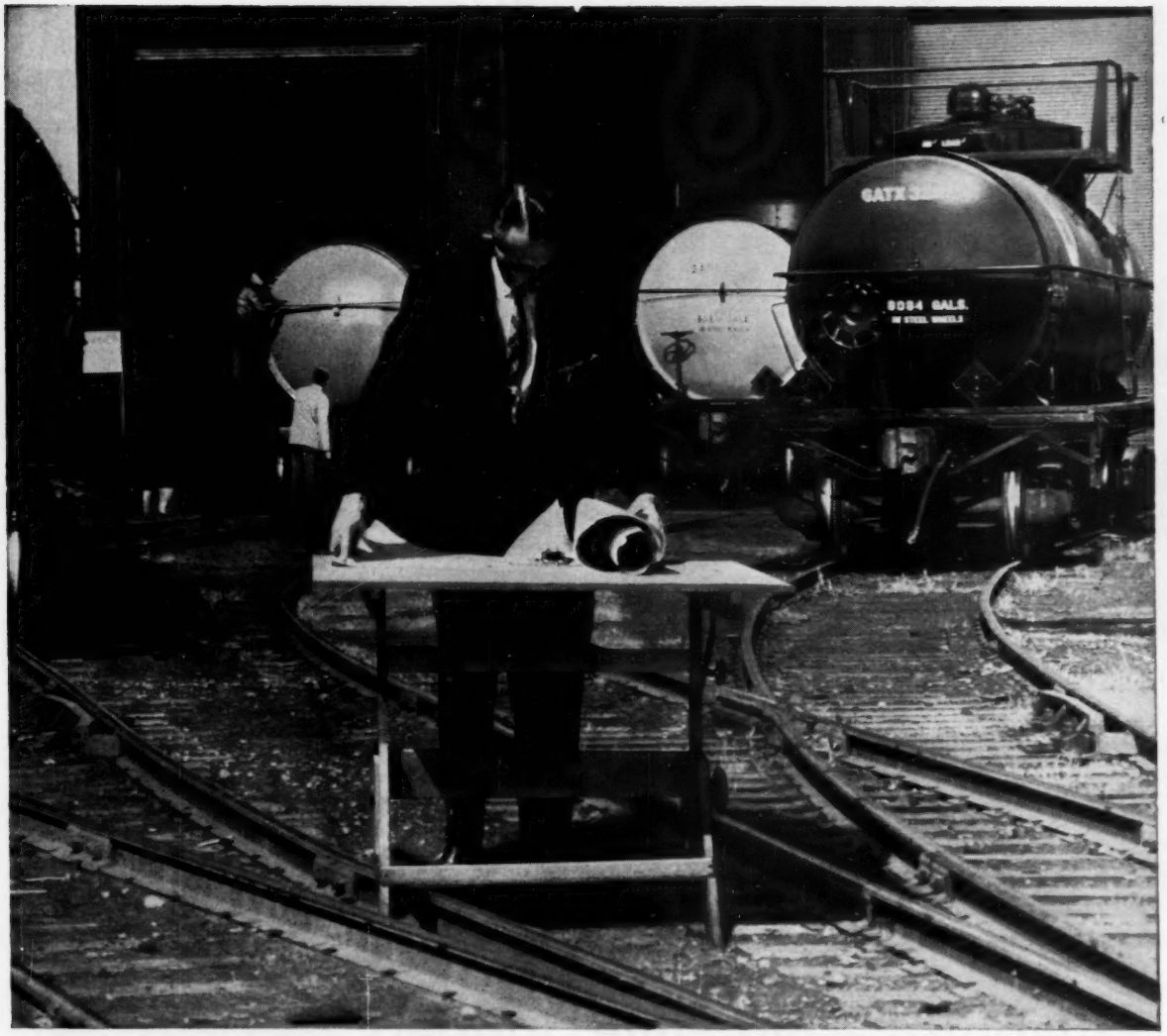
So far we have only made a start, but we're convinced that more and more repetitive and clerical operations will succumb to automation.

What's ahead in purchasing data mechanization?

JAREMA: Automation will eventually integrate purchasing into an accounting-inventory-production control system. Forecasts and sales orders will become the input, and purchasing requisitions will comprise the output.

Reduced inventory costs will become possible by selecting reorder points to match current activity. Stored information will allow machine monitoring of the total delivery situation. The complete record of any item on order can be almost instantly screened out for review. Internal records can be as completely current as the last transaction processed.

*In New York and Chicago.



What does an engineer do for GATX?

Engineering a special-purpose tank car is a job for experts. Stress, mobility, center of gravity, corrosion resistance—these are a few of the factors to be considered. At General American you'll find engineering specialists—men who pioneered with aluminum tank cars. These made possible bulk shipments of hard-to-handle liquids. You'll find men who developed the first flued-dome tank car, the first all-welded underframes, the first half-oval heater coils—and a long list of additional improvements.

This engineering skill and experience that make such developments possible is part of every GATX lease—a lease that provides shippers with the most dependable service available for bulk liquid transportation. When you lease cars from General American, you avoid the need for capital investment as well as operating, servicing and maintenance problems.

If you'd like additional information concerning the advantages of a GATX lease, call or write your nearby General American District Office.

It Pays to Plan With General American

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GOLDEN TRIANGLE: Growing chemical consumption, growing prospect for l.c.l. sales scramble.

Pittsburgh—'Big Time' Jobbers' Next Target

Overlooked for years as an important market for integrated less-carload-lot selling, the Pittsburgh area, is breaking out in a rash of activity by big, broad-line distributors.

Items: Western Pennsylvania Chemical Co. has already set up sales offices and warehouse facilities on Neville Island. McKesson & Robbins will soon expand its Steel City sales force, is considering tank-farm facilities. Carmac Chemical is installing tank-farm storage.

Pittsburgh has long been a puzzle to both manufacturers and distributors. Many limited-line jobbers serve the territory, but it has failed—until now—to appeal to the bigger boys. (McKesson, for example, views its Pittsburgh branch as a small operation.)

Local producers and jobbers cite these reasons for the dearth of "big time" jobbing in Pittsburgh:

- The steel industry's huge chemical consumption has diverted the attention of manufacturers from l.c.l. sales.
- Large-volume users have been "too big for the distributor" to handle.
- Small-volume users — although they use a wide range of chemicals —have not bought in quantities sufficient to encourage multiple-line distribution.
- Small-volume buyers pool orders, purchase in carload or truckload quantities, and split the shipment.

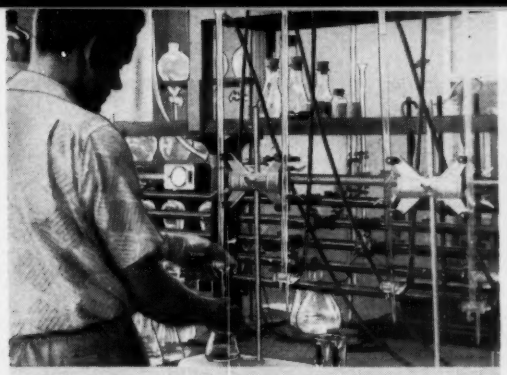
But the chemical-consuming industry in the area has been growing.

Some producers, moreover, seek to crack l.c.l. Pittsburgh markets. These factors could explain the interest of McKesson and Western Pennsylvania.

Neither, however, will face easy-selling. Some local limited-line distributors are fair-sized operations. E. J. Fedigan Co., for example, uses seven salesmen, does most of its business (heavy chemicals) in truckload and carload volumes. Cleaning Materials & Chemical Co. has 20 salesmen moving some 3,000 specialty items in the janitor-supply field.

In specialized heavy-chemicals distribution, Fort Pitt Chemical, S. H. Bell Co., Fred J. Durner Chemical Co. and Opalco Laboratories are considered well established. And some Pittsburgh sales managers believe M. M. Baddeley Inc. to be the area's largest distributor in the laundry, dry cleaning and hospital-chemicals fields.

What does the area's new distributor activity mean? For the manufacturer, it is evidence that there's some profitable markets waiting to be tapped; for the consumer, there's the likelihood that more intensive competition will boost service and availability of l.c.l. chemicals. And for the distributor, there's the certainity of a tough sales scramble.



Using titration apparatus, technician checks acid value of UNITOL ROS.

UNITOL ROS is consistently pale in color. Typically lighter than color standard "X"

Save on Rosin Costs with UNITOL ROS

You can save substantially on rosin costs with Union's *UNITOL ROS*. This new tall oil rosin is a pine wood derivative obtained in the Kraft paper manufacturing process. It is low in cost, uniform in quality and, because there is no captive consumption, you are assured of constant supply.

In chemical and physical characteristics, *UNITOL ROS* compares favorably with gum and wood rosin. Typical analyses show a color paler than "X" and a softening point (Ring and Ball) of 85° C.

These factors, coupled with the competitive advantage of lower price, indicate that *UNITOL ROS* should have a valuable place in your manufacturing operation.

Write for samples and additional information.

A COMPLETE RANGE OF TALL OIL PRODUCTS

Union Bag-Camp is the only single source for:

Refined Tall Oil	Tall Oil Fatty Acids	Crude Tall Oil
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Chemical Sales Division

UNION BAG-CAMP PAPER Corporation

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IN SALES CONTRACT HASSLES, LEGAL KNOW-HOW HELPS . . . . .

Problem	Remedy
● "Partial requirement" clauses	Make terms as specific as possible; otherwise you have only "moral commitment" from vendor.
● Supplier disclosure of secret data	Set up a system to learn what facts must be kept confidential, write restrictions into contracts.
● Violation of price-discrimination law	Act on knowledge that buyers as well as sellers can be prosecuted under Robinson-Patman Act if price is illegal and buyer knows price is illegal.
● Narrow grounds for negotiations on terms	Know what the "fine print" in agreements means; it often contains restrictions worth bargaining about.
● Obtaining damages when products fail to perform	Consider the contract the only basis for determining rights; if you need protection, have it written into the terms.

Put a Lawyer on the Buying Squad

Should chemical purchasers shun legal services because lawyers "just aren't realistic about practical purchasing operations?" That's the question Hercules' legal director, Charles Maddock, put under searching examination this week at the midwinter meeting of the Chemical and Allied Buyers' Group (*see p. 68*).

His verdict: an emphatic "No." Calling for more "preventive law," Maddock made a strong case for putting lawyers on the purchasing team.

Crux of his argument: buyers skimp on legal services because the purchasing men and the attorneys "have failed to develop common understanding."

When the lawyer appears to be unrealistic about practical purchasing problems, says Maddock, it's usually "because the purchasing department is trying to take action contrary to law or involve the company in extra-hazardous legal risks that the lawyer refuses to sanction."

The lawyer's opinion is purely legal advice, emphasizes Maddock. "Lawyers don't evaluate business risks. . . . the final business decision is not the lawyer's." The lawyer, however, can be a valuable aid in decision-making —particularly where legal pitfalls are involved.

Communications Channels: Lawyers, however, can't give a book of rules applicable in every case; the buyer must be able to "distinguish between routine purchases and those requiring special attention." Communications, believes Maddock, can develop the guides. Some tips:

- Hold meetings between attorneys and purchasing agents to review the entire purchasing procedure.
- Make a standard procedure of "raising questions through established channels when unduly burdensome restrictions appear required by attorneys."
- Arrange to have your attorney alert you to special legal developments that affect buying. Written bulletins and general meetings can do the trick.
- Let the attorney attend some purchasing department meetings. It will familiarize him with purchasing problems and requirements.

Benefit Bounty: Full use of legal services can prevent many a legal problem (*see above*) and reduce, for example, the growing danger of a buyer's prosecution for violation of price discrimination laws. But, perhaps, most significant, legal advice can make a purchasing man aware of all possible areas of negotiation. "Too many [purchasing men] complain that they aren't given a chance to negotiate contracts, yet more than 50% of purchase orders require some negotiations on terms and conditions," says Maddock.

Awareness of the meaning of often-taken-for-granted causes and the differences between sales terms on vendor documents and purchasing conditions on buyers' order forms broadens opportunities to negotiate.

Put a lawyer on the buying squad, and you can expect sharper bargaining, less confusion on sales terms.

This man divides by 3 to stretch glycol dollars

(Loading superintendents put advanced methods to work)

"A dollar saved is a dollar earned." That's an axiom many Dow customers find rewardingly true.

One midwestern resin maker, for instance, uses diethylene glycol in polyesters, as well as glycerine and propylene glycols. His requirements call for less than carload quantities, yet he buys at full tank-car prices. It's simple mathematics.

One of our loading superintendents makes use of a three-compartmented tank car. Thus, this one car takes on the glycols . . . carries all three to the customer at the carload quantity purchase price.

This isn't unusual. It's just typical of the advanced methods and techniques that give Dow customers more for their money in many ways. For, large or small, the chemical user benefits from a forward-looking plan that is geared to tomorrow's needs . . . today. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. GD 811A.

YOU CAN DEPEND ON DOW

More BROMINE

for chemical processing

Now you can benefit from the processing advantages of elemental bromine and be confident of a continuous source of supply. Our new bromine plant † at El Dorado, Arkansas, now is in operation; from it you can secure uninterrupted deliveries up to 100,000 lb. tank car quantities. This added capacity to our production from plants at Saint Louis and Manistee, Michigan, permits you to take full advantage of bromine's unique properties and characteristics.

In many instances, bromine can supplant elemental chlorine and fluorine with marked improvement in processing yields, ease of handling, and developing new products. Specifically, you'll find . . .

Bromine compounds increase processing yields in:

Quarternary salt formations; nitrile formations; hydrolysis to carbinols; Grignard reactions in the aromatic series; Ullmann reactions, and Reformatsky reactions.

Bromine offers such processing advantages as:

- Liquidity — no pressurized equipment required.
- Lower oxidation potential than those of chlorine or fluorine.
- Melting points of bromides are higher than those of chlorides or fluorides.
- Exceptionally high densities of bromine compounds.
- Catalytic properties of various inorganic bromides in reactions involving intramolecular rearrangements.

New product opportunities:

- Bromine imparts greater fire resistance to organic compounds than low molecular weight halogens.
- New pharmaceuticals are possible with bromine compounds as intermediates.
- Bromine can be compounded to produce active germicides, bactericides, and algicides.

You may discover many other significant and profitable bromine uses now that it is available in quantity. Michigan Chemical will be glad to help you with your present bromine needs, or with your basic bromine research. Just write or phone us.

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C-56-14

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† A joint-venture project of Michigan Chemical Corporation and Murphy Corporation of El Dorado, Arkansas

Market Newsletter

CHEMICAL WEEK
February 2, 1957

U.S. chlorine capacity will climb to well over 3.5 million tons/-year by the end of '58 if all plant expansions—planned or now on the way—are completed on schedule; this forthcoming capacity boost, as estimated by Bert Cremers, president of the Chlorine Institute, agrees well with *CW's* earlier forecast (*Jan. 14, '56, p. 73*), which conservatively put the 1960 capacity at more than 4 million tons/year.

The industry's steady 8-10% annual rate of growth, notes Cremers, has already upped total chlorine capacity to 10,900 tons/day, and actual output to 10,200 tons/day.

Sidelight: the present rate of chlorine production requires the use of 11 billion kilowatts/year of power—equal to one-fiftieth of the country's total output of electrical energy.

•

Now there are three producers of chlorofluorohydrocarbon refrigerants and aerosol propellents. Completion of a major plant addition at Pennsalt's Calvert City, Ky., works puts the firm's Isotrons into competition with similar products made by General Chemical (Genetrons) and Du Pont (Freons). (Du Pont, by the way, just recently brought its fourth Freon plant onstream, *CW Market Newsletter, Dec. 8, '56.*)

Pennsalt's second Isotron unit—also part of a $55-million expansion program—will be completed later this year.

•

A big polyethylene capacity boost by Texas Eastman (Longview, Tex.) brings the firm's potential output of the plastic to 55 million lbs./year. It's the second increase within a year; only last February the company was busy raising output to 40 million lbs./year.

Too, "sizable" installations for processing and compounding special formulations of polyethylene were completed in '56 at Tennessee Eastman's Kingsport, Tenn., plant.

•

And full-scale commercial production of a rigid thermoplastic based on styrene and acrylonitrile has been started by Dow Chemical. The improved copolymer, tradenamed Styrex 767, can be extruded or molded, is resistant to acids, bases, salts, oils, waxes, soaps and many solvents.

•

West Coast chemical and allied industries will soon have a local source of carbon and graphite electrodes, including electrolytic anodes; a plant to produce these carbon products is being completed by Crescent Carbon Corp. (near Rosamond, Calif.).

Carbon and graphite electrodes are used in the manufacture of abrasives, calcium carbide, ferrous and nonferrous metals and alloys, phosphorus, iron, some types of steel. Users of electrolytic anodes include

makers of chlorine, caustic soda, caustic potassium, chlorates, hypochlorites, metallic sodium, aluminum and magnesium.

•

The supply-heavy position of the glycerine market, as evidenced by high inventories (close to 68 million lbs.) and talk of possible price-easings (*CW Market Newsletter, Jan. 19*) is further underscored by Scott Pattison, manager of the Glycerine Producers' Assn.

Speaking at the association's annual meeting, last week, Pattison urged producers to intensify efforts to hold and expand their present glycerine markets. Glycerine output in '56, he noted, hit a new high; total production (on a 100% basis and including both crude and propylene-derived material) was about 246 million lbs., or 18 million lbs. more than in '55. An estimated 145 million lbs. of it came from fats.

Exports in '56 totaled about 16.8 million lbs. (100% basis); but particularly notable is the fact that imports of crude glycerine continued despite heavy increases of domestic stocks.

•

The plasticizer market this week is still in a state of confusion. Some dioctyl phthalate producers, for example—while stubbornly maintaining an official listing of 28½¢/lb. (tanks)—are matching other sellers' 28¢ tag. In a few isolated instances, even lower prices are being met.

This lack of stability, a recurring feature of the plasticizer market for some time, was highlighted anew by the recent 2¢/lb. cut in tricresyl phosphate prices. Behind that move: an attempt by TCP makers to regain some outlets lost to phthalates.

Crux of conscientious producers' concern today, however, is this: "Costs of manufacturing good grade material are dangerously close to the 'point of no (profit) return.' If pricing pressures aren't relieved, and soon, customers, too, will lose out."

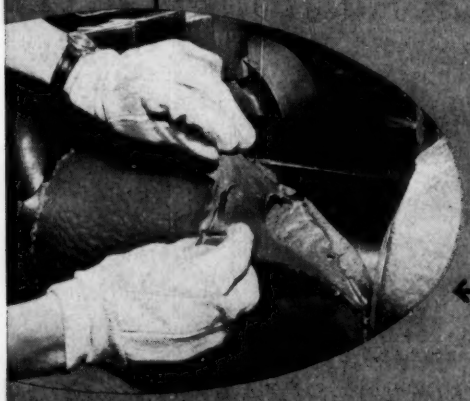
SELECTED PRICE CHANGES—Week Ending January 28, 1957

UP

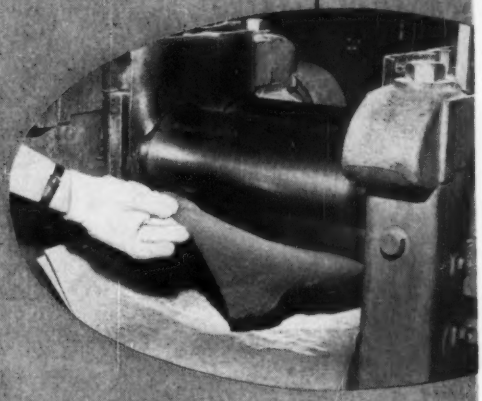
	Change	New Price
Barium carbonate, precip., bgs., c.l., wks., ton	$4.00	$104.00
Dihydrostreptomycin hydrochloride, bulk, gram	0.010	0.085
Penicillin, crystalline, potassium, million units	0.015	0.675
Tin, metal (Straits)	0.015	1.03
Potassium stannate, dms., frt., alld., E.	0.005	0.789
Stannic chloride, anhyd., dms., wks.	0.005	0.804

All prices per pound unless quantity is stated.

WEIGH THE ADVANTAGES OF BARRETT'S NEW A-C† POLYETHYLENE LUBRICANTS



Neoprene stock sticks to mill, must be laboriously scraped off.



Same neoprene formulation with addition of 2 parts per 100 of A-C Polyethylene Lubricant. See how stock rolls smoothly from mill.

For the first time, you can have the *advantages* of a lubricant in your rubber compounding without the *drawbacks*. A-C Polyethylene Lubricants are a new Barrett development, completely different from ordinary waxes you may have used. They detackify at elevated mill, Banbury, and calender temperatures of 200° F. and higher . . . aid filler dispersion . . . improve mold flow and release . . . increase extruding and calendering speeds . . . reduce shrinkage of milled stocks. Troublesome elastomers, particularly neoprene and "Hypalon," actually become easy to mill.

Most important, A-C Polyethylene Lubricants won't bloom in cured or uncured stocks; and they're non-staining, non-discoloring, non-migrating and non-toxic. Evaluate them in your own formulations. Ask your Barrett representative for technical data and samples.

† A Trade Mark of Allied Chemical & Dye Corporation

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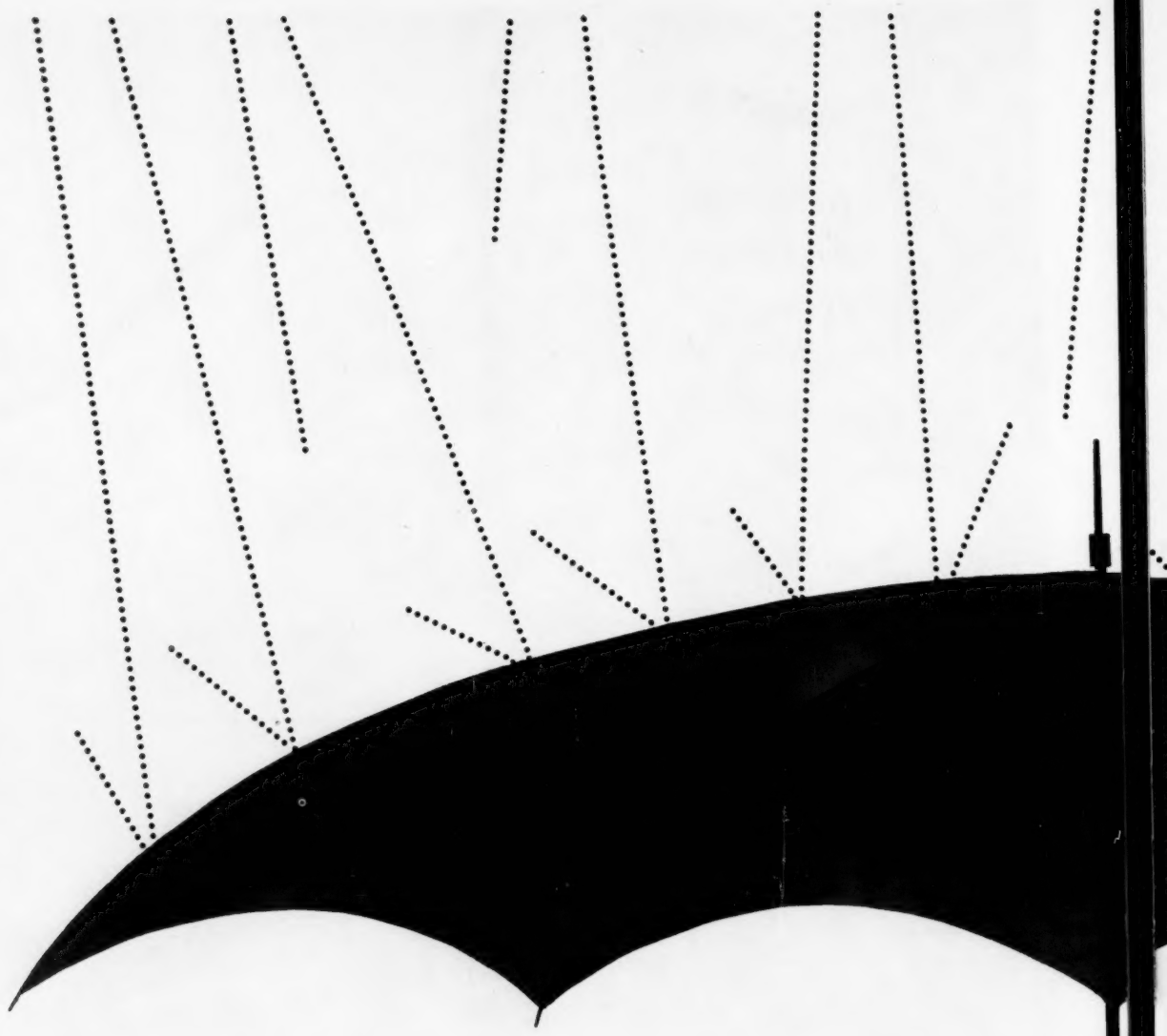
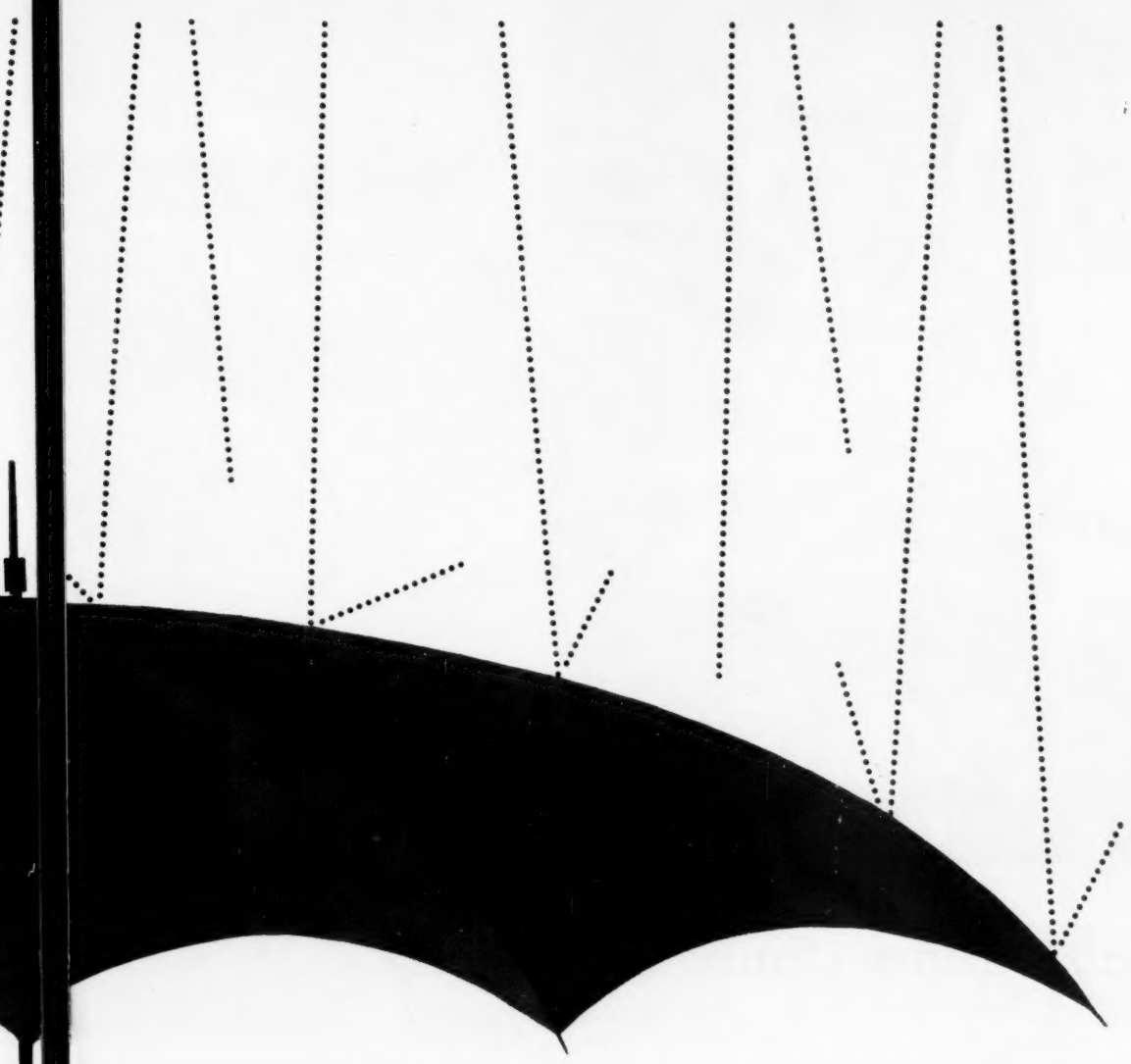


right as rain



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ON EXHIBIT: a bustling multimillion-dollar chemical outlet in pleasure craft.

Sunday Sailors Churn Up a Market

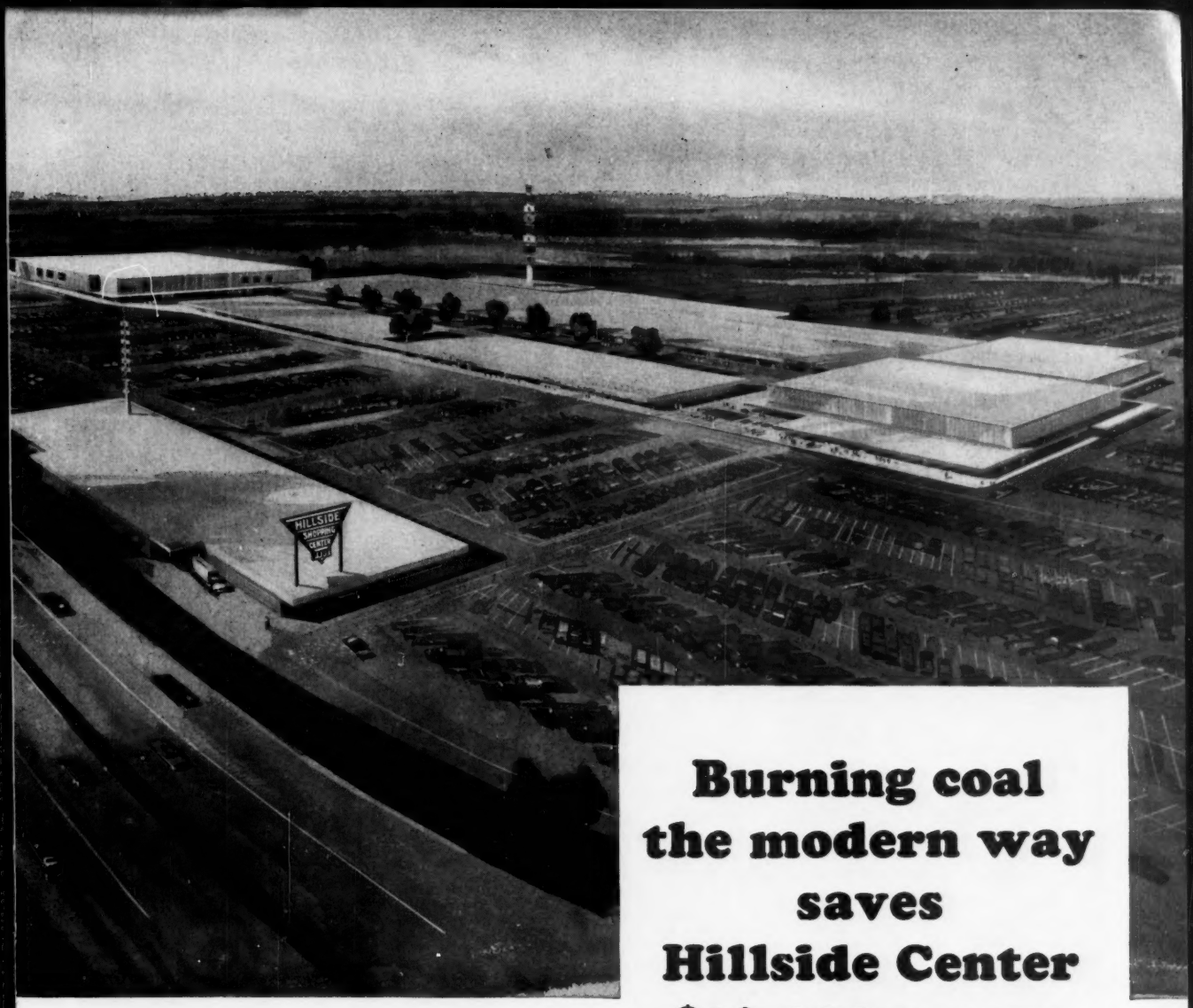
Chemical marketers who are unable to differentiate a spinnaker from a mizzen boom may well be losing out—in chemical sales—to more nautical competitors. And last week, at the 47th National Motor Boat Show held in New York's Coliseum, even a confirmed landlubber would have been impressed by the obviously huge—and diverse—markets for chemicals in the current boat-building boom.

Sea-way Crowding: Last year an estimated 28 million Americans (about 17% of all persons living in continental U.S.) participated in recreational boating; and a total of 5,971,000 pleasure craft—one for every 28 persons in this country—carried the part-time sailors over U.S. waters. (Compared to the near 6 million boats afloat in '56—and in striking evidence of the sport's increasing popularity—5,023,000 craft were in use in '53, 2,440,000 in '47.)

Of all the boats in use last year, by far the largest number (over 4.5 million) were powered by outboard motors. These included runabouts, dinghies, prams, canoes, dories and rowboats. An additonal 397,000 motor boats, numbered for use on federal waters, included inboard cruisers and runabouts, outboard boats over 16 ft. long, auxiliary sailboats.

About 450,000 inboard motorboats (unnumbered) were used on waters not under federal jurisdiction, and some 575,000 sailboats without in-

OUTBOARD LINEUP: Power for runabouts, dinghies, prams, canoes, dories.



Burning coal the modern way saves Hillside Center $26,000 a year

The new Hillside Center, Chicago, Ill., is one of the country's largest and most modern shopping centers. Situated on a 59-acre site, it contains over 70 stores and offers parking space for nearly 5,000 cars. When Hillside Center was planned, exhaustive studies were made of prospective fuels . . . and it was decided to burn coal the modern way. For one thing, the initial economy of the mechanical system indicated coal. The cost of a complete coal system—boilers, coal and ash handling equipment, controls, etc.—fell within budget limitations. And, in view of limited space, the compactness of the system was an additional inducement. Finally, boiler room labor costs are at a minimum and actual operation savings with coal, compared to other fuels, is estimated at $26,000 a year.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

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board power were used. The remaining 4,000 craft used were inboard cruisers and auxiliary sailboats, 5 net tons or over, documented by the U.S. Bureau of Customs.

Billion-Dollar Industry: In all, Americans last year spent $1.25 billion at the retail level for new and used boats, accessories, safety equipment, fuel, insurance, etc. Of this total, nearly $316.5 million went into the purchase of new outboard boats and motors.

And according to a survey by the National Association of Engine and Boat Manufacturers, the '56 sales volume of 32 boat builders (who exhibited at the Coliseum) was over $24.5 million or 43% higher than in '55; another $10 million increase in sales is expected for '57.

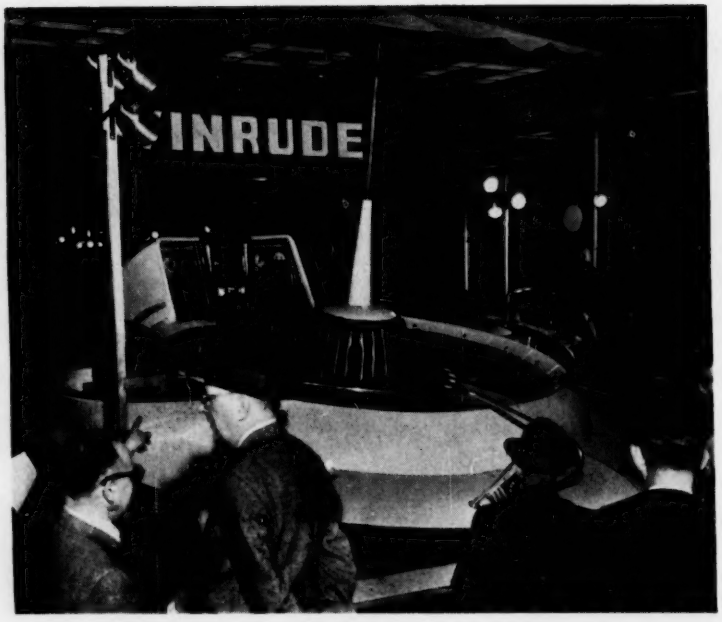
Twenty eight builders reported that they had sold a total of 57,181 units in '56, or 64% more than had been turned out in the preceding year; the same firms will build an estimated 73,000 craft this year—which represents another 30% boost in production.

All this, of course, spells more business for the chemical industry. For example, a total of 434,000 recreational craft were built in '56; 40,000 (30% more than in '55) of these were made of reinforced plastic. The estimated total output of boats in 1960 is 600,000; 100,000 of them will probably be made of plastic.

Chemical Tack: How much resin and other materials go into a "typical" boat hull? A 42-ft. sailboat made of wood, fiber glass and polyester resin may require as many as 11 coats of the resin to hold the layers of glass. Such a hull may contain some 5 tons of material—58% resins, 40% glass cloth, 2% pigments.

For a 16-ft. outboard pressure-molded hull, the resin, filler, and pigment contents may run about 84%, 10%, and 6%, respectively.

In addition to glass-reinforced hulls, plastics, of course, find many other outlets in the boat industry. Typical uses: hydrofoils of reinforced epoxy resins; flexible pipe for plumbing; vinyls for upholstery (vinyl laminated with aluminum is now available for deck covering to match vinyl upholstery); floats, bumpers, mooring buoys; acrylics for glazing (windshields, windows, canopies, sunshades, hatch covers, spray shields, instrument



Souped-up Saucer for Anglers

To give the 20th-century Isaac Walton a peek into the future, planners at Evinrude Motors created (and displayed at the National Boat Show) the plastic saucer shown above.

The craft is designed to help the sportsman pit scientific ingenuity against his quarry. Its 13-part data computing and programing system (which presents a continuous flow of audio and visual information to the anglers) kept visitors to the exhibit gaping.

Main feature of the electronic-age boat is a color-television camera that sweeps the ocean floor to reveal the underwater scene on a 130-sq.-in. screen, while a loudspeaker reports sonar "pings" or natural ocean sounds.

A bank of glow-type indicators provides instantaneous statistical reports on targets shown on the TV screen. Typical data: target size, speed, course, drift, longitudinal-latitudinal bearing, prevailing sea conditions, ship's course.

A 16-segment navigation-direction channel indicator (covering all major compass points) is programed by incoming sonar and other vital data.

One indicator of a compass rose follows the bearing of the transducer (sonar, fish-finding, depth-sounding gear) and the TV camera; the other indicator gives the boat's true bearing.

One of two depth-sounding (fathometer) recorders features an electric stylus that etches a permanent record on rolls of recorder-graph paper.

In addition to the complex sensing equipment, the craft boasts twin motors for powered steering, circular seating for easy casting, motor-operated parasol for shade, plenty of storage space for bait, tackle, fish and refreshments.

And, to make the quarry's chance of escape virtually impossible, radio equipment can be used to summon other fishing boats to the area pinpointed by the "Subsea Control." The only question is: Will it be sport?

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HOOKER CHEMICALS PLASTICS

covers, etc.). Expanded foams (such as Styrofoam) are used in large amounts to fill flotation chambers—one estimate indicates 1 billion lbs./yr. are used in pleasure craft.

What was the total volume of plastics used in '56 in the manufacture of boats and boat accessories? About 22 million lbs., according to an estimate by the Society of the Plastics Industry.

Sizable markets for synthetic fibers: sails, deck overlays, cordage, and other uses. For example, the use of cotton in racing sails is virtually a thing of the past; the switch to synthetic fibers —mainly Dacron—has been nearly completed.

Many top sailmakers report that from 90-99% of their sails are now being made from Dacron. The one exception is fabrication of spinnakers for which nylon (because of better ballooning properties) is the favored material. One estimate of the amount of Dacron that will go into sails in '57: 250,000 lbs.

This changeover to synthetic materials in sails has been accomplished despite the fact that use of the man-made fibers boosts sail costs from 10-25%; but the nation's sportsmen are willing to pay the difference for Dacron's greater strength, resistance to stretching and rot, easier handling.

One other synthetic that may yet become important in sailmaking is Mylar, if tests now under way are successful.

Cordage is another important outlet for both Dacron and nylon. The total amount of these materials used in cordage for pleasure craft was about 450,000 lbs. in '56, will probably increase to about 600,000 lbs. this year. Approximately two-thirds of the total for each year consists of nylon, the remainder is Dacron.

(Orlon, too, is getting into the picture on a commercial scale; at least one firm is making boats featuring overlays of this synthetic. Others are said to be experimenting with Dacron for similar uses.)

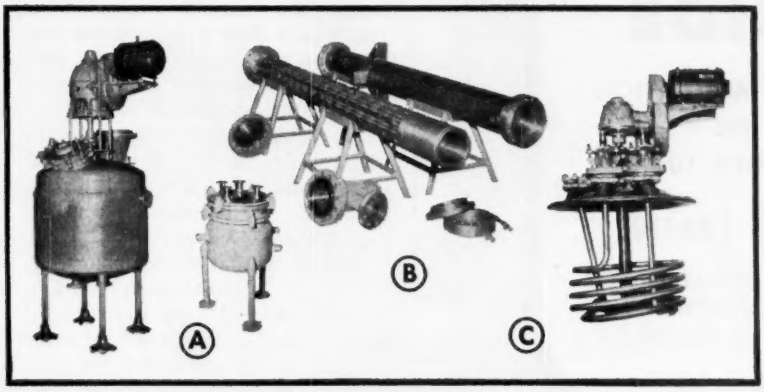
Paint and Varnish: Just what impact the advent of plastic hulls, deck overlays of synthetic fabrics, etc., are having on the use of varnishes and paints in the boat industry is moot.

One industry expert estimates that last year 750,000 gals. of paint were used to finish the nation's pleasure craft; 40% of the boats were painted in two tones, and of these, at least

Corrosioneering News

Quick facts about the services and equipment available to help you reduce corrosion and processing costs.

Published by The Pfaudler Co., Rochester, N.Y., U.S.A.



A. Pfaudler titanium reaction kettles for high-temperature processing.
B. Pfaudler packed floating head titanium heat exchanger.
C. Pfaudler titanium loop coil for use in titanium reactor.

When should you use titanium process equipment?

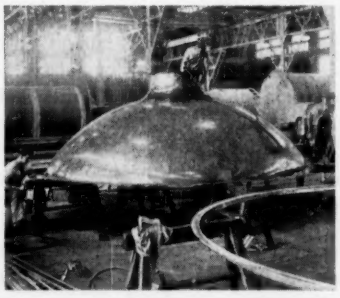
Titanium, a relatively new material of construction, shows great promise in reducing corrosion costs under severe chemical conditions.

As corrosioneers, Pfaudler has studied its characteristics, developed welding techniques, designed and built quite a range of titanium process equipment. Some are shown above and others are being fabricated now.

Because production costs of titanium have been greatly decreased, titanium should now be considered as a material of construction wherever it is economically feasible to do so. It has superior resistance to nitric acid solutions at high temperatures, chlorinated organics and inorganic chloride solutions, and shows excellent resistance to mixtures of sulphuric and nitric acids and also to aqua regia.

There are also other materials which provide excellent chemical resistance, among which is Pfaudler glassed steel. Each case should be considered on its own merits.

Our main point is this: When you are up against any kind of a corrosion problem, Pfaudler is ready and anxious to give you the benefit of its 73 years of experience in designing and fabricating equipment that will do the best job at *the lowest over-all service cost.* If titanium is indicated, you can rely on Pfaudler know-how to do just that. Your inquiries are welcomed.



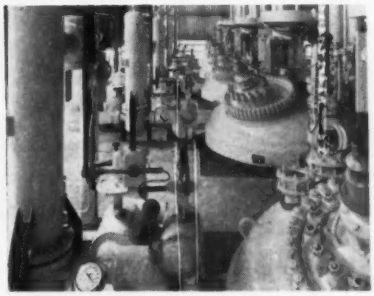
Copper and copper alloy equipment . . . For services involving acid solutions of low oxidizing capacity, copper and copper alloys may be the best answer to your problem. Pfaudler's long experience in building copper vessels and heat exchangers assures you of top-quality engineering and workmanship. You will also find Pfaudler prices competitive. Let us quote on your requirements for equipment of this type.

Glassed steel for the petroleum industry

The petroleum industry, like chemical processing, finds in glassed steel equipment a material of construction which is proving most economical in the battle against corrosion.

Great improvement in the resistivity of Pfaudler glass and its application to many different types of open hearth steel designs, are mainly responsible for this trend. Pfaudler glass, now resistant to all acids (except hydrofluoric) and to alkaline solutions to pH 12 at 212° F., provides about as much flexibility as you can find in any one material of construction.

Used in the form of reactors, columns, settlers, mixers, storage tanks, pipe, fittings and valves, Pfaudler equipment is giving excellent service for reactions involving hydrochloric acid, chlorinated solvents, pesticides, vapor degreasing solvents, etc. It is also used in the hydration of olefins,



to prevent corrosion by sulphuric acid, in certain phases of producing cumene-derived phenol and by-product acetone in polyester resins and synthetic fibres.

Installations of Pfaudler glassed steel polymerizers are so numerous that standardized designs have been developed. Glassed steel can be cleaned quickly after each run; a build-up of product within the vessel is easily prevented.

In petroleum refining operations, corrosion during crude distillation has been minimized. Glass helps to prevent passage of hydrogen to the steel surface, eliminating atomic hydrogen attack. There are other applications too numerous to include here. May we send you more information?

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75% had white as one of the colors. Colors of the remaining 60%: 35% white, 15% green, 10% blue.

This estimate does not, however, include varnishes and other finishes, and the total consumption is considerably higher. The National Association of Engine and Boat Manufacturers has estimated that in 1955 some 5.6 million gals. of special paints and varnishes were used on pleasure craft.

Petroleum Products: Both the steadily increasing number of motors put in use, and a trend toward higher horsepower are boosting the demand for petroleum products.

Production of outboard motors, in '56, was a record-breaking 630,000 units, or 142,000 more than in '55. In 1947, 87% of all motors sold were rated at 7 horsepower or less, and only 2% were more than 12 h.p.; in '56, 38% of total motor sales represented motors in the 12-hp.-or-larger group, and 27% were 7 h.p. or less. Now the swing is to still more power with 30-h.p. motors becoming increasingly popular.

Net result: last year, gasoline consumption by pleasure craft was an estimated 331 million gals.—137 million gals. for inboard motors and 194 million for outboards. Consumption of diesel fuel oil was about 17.5 million gals. The demand for lubricating oil was 15,225,000 gals.—3.1 million gals. for inboards and well over 12 million for outboards.

Outlets Galore: It would be virtually impossible, of course, to pinpoint all uses of chemicals in the industry. But even a representative listing will point out the host of opportunities for the boat-conscious marketer of chemical products.

Other items run the gamut from fire extinguishers to batteries. Typical examples: rubber items; liquid detergents (some 460,000 gals. used in '55); wood doughs; caulking compounds; putties; hull-glazing supplies for do-it-yourself sailors; alcohol for cooking purposes (2.2 million gals. used in '54); aluminum for hulls, etc., corrosion-inhibiting chemicals and paints for aluminum parts.

Conclusion to be derived from this rundown and from the spanking success of the just-ended National Motor Boat Show: ambitious chemical sellers, now skimming along on a multimillion-dollar market, can look forward to even greater sales ahead.

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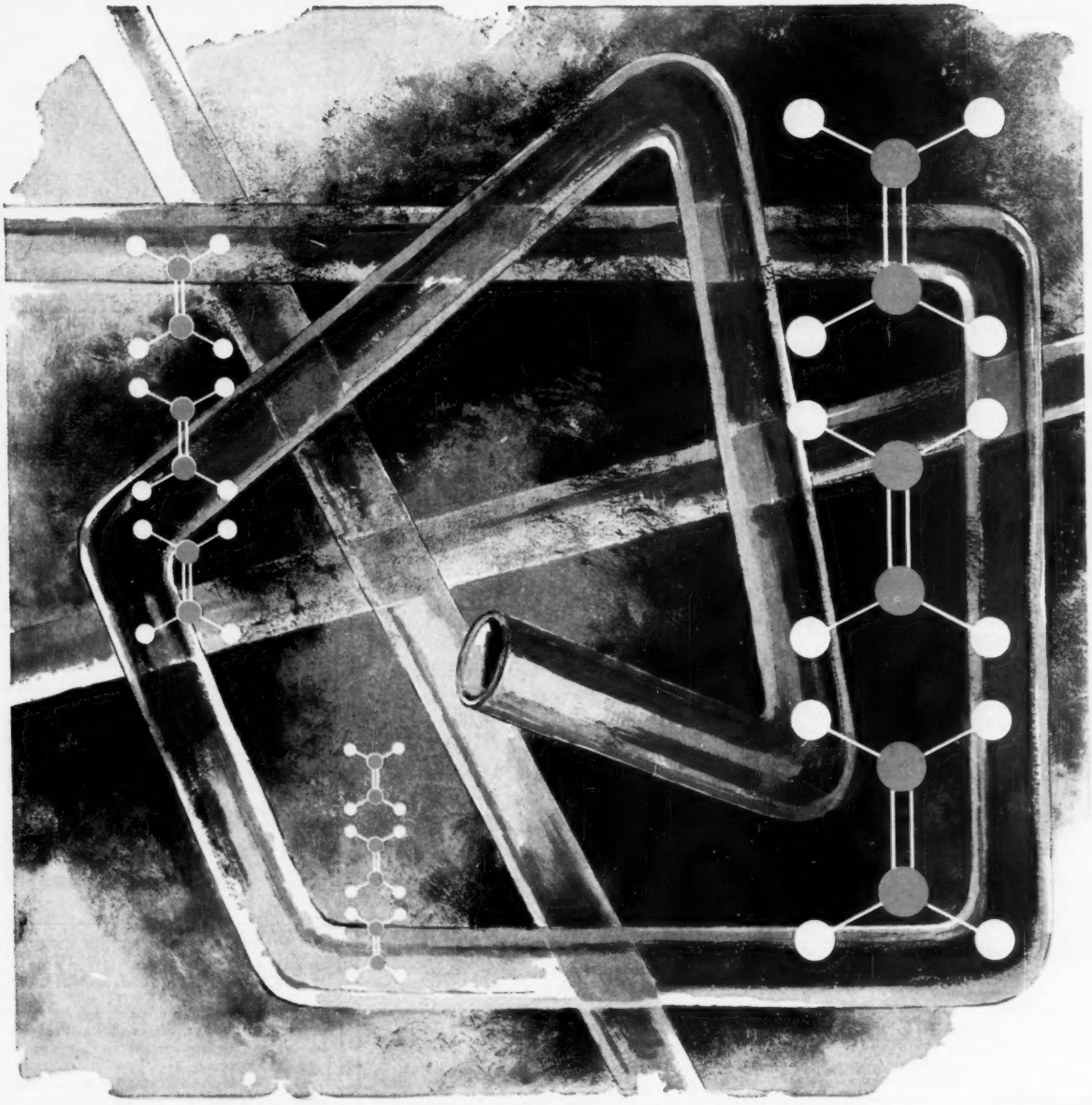

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